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THE

PSYCHOLOGICAL BULLETIN

FUNCTIONAL ABNORMALITIES OF MEMORY WITH SPECIAL REFERENCE TO AMNESIA

BY ROBERT R. SEARS

University of Illinois

Introduction

On grounds of logic and terminology memorial abnormalities may be divided into amnesia, hypermnesia, and paramnesia, but psychologically these three kinds of behavior have little in common; this is particularly true with respect to their etiological aspects. The present review has been limited to the facts and etiological theories of amnesias for three reasons. First, the phenomena are more adequately described than are those of hypermnesia and paramnesia and seem to form a more unified group than the latter. Second, the theories relating to amnesias are more sharply circumscribed and more directly relevant to the problems of normal memory. And finally, the psychology of normal forgetting has produced principles and experiments which may be useful in a consideration of amnesia, whereas there is little that seems relevant to hypermnesia or paramnesia.

Among the kinds of behavior describable as hypermnesic may be included the panoramic recalls reputed to accompany death by drowning or asphyxiation, the extensive mathematical or historical memories of idiot-savants, obsessional imaging or verbalizing, compulsive automatisms, and to some degree at least the intervening behavior patterns of alternating personalities. Under paramnesia may be included false recognition (*déja vue*), depersonalization and disorientation, and retroactive falsification. A consideration of these varied phenomena would require analysis of the entire problem of

symptom formation in the neuroses and psychoses, and it is doubtful whether anything would be gained from bringing together such a heterogeneous collection of materials merely for the sake of a conventional terminology.

Although the initial studies of memory from the experimental (Ebbinghaus) and clinical (Azam) points of view were presented within a few years of each other, little effort has been made to link the two sets of observations and conclusions in a single systematic structure. A number of factors have combined to prevent this, the principal one being perhaps the difficulty and danger involved in any attempt to reproduce experimentally the profound amnesias found in neurotic patients. Artificial induction through hypnosis, as used by Janet, Sidis and Prince, was largely useless because of the confusion concerning hypnosis itself.

The necessity for reproducing abnormalities in the laboratory derives directly from the general methodology of the study of memory. Following Ebbinghaus' lead, the primary emphasis has been placed on *systematic variation of the extra-organismic conditions of learning and recall, e.g.* differences in materials learned, amount of practice, length of retention period, etc. From the facts concerning these external conditions suppositions have been made concerning the psychological processes operating to effect the results obtained (laws of memory); *e.g.* from the fact that interpolation of learning decreases the recallability of previously learned material is posited the process of retroactive inhibition. Such principles do not take into account individual differences arising from intra-organismic factors such as motivation, meaningfulness as determined by individual experience, or constitutional predisposition.

In the study of abnormalities emphasis has been laid on *intra-organismic conditions or processes* which, given constancy of external conditions, produce individual differences in ability to recall. This alternative emphasis has come about for two reasons: first, because in mental disorders it has heretofore been impossible to obtain a desirable constancy of external conditions, and second, because the widely diverse external conditions found associated with memorial abnormalities have seemed to cancel each other without leaving any one omnipresent factor. Freud, in positing repression to account for amnesias, had come to the conclusion that any kind of material could be forgotten providing the proper motives were operating; Prince, for want of a demonstrably constant external factor, explained

amnesic periods on the basis of conflicts between constellations of mutually incompatible ideas.

While the distinction between extra- and intra-organismic factors is somewhat arbitrary, and significant in a genetic sense only,[1] it has nevertheless had considerable influence in determining the types of hypotheses developed for the explanations of memorial abnormalities. Clearly the two sets of factors must be synthesized in any final coherent analysis of these phenomena.

To date all attempts other than those using hypnosis have failed to develop artificial amnesias by the use of external factors; *i.e.* modification of materials, conditions of learning and recall, and supplementary stimulation by "emotional" stimuli. Few efforts have been made to measure internal conditions in the laboratory. The probable future course of experimentation will be in the direction of *development and control* of motivation and meaning in artificial situations. If with mild degrees of modification of these factors evidence of mild amnesias and hypermnesias can be obtained no necessity will exist for their production in the more profound and dangerous degrees.

The bulk of the literature on memorial abnormality is clinical. Each investigator has examined, described, and discussed his case material from a single theoretical position, his own. As a result the data cannot be profitably examined from any other point of view; *e.g.* Morton Prince's cases give little information relevant to the concept of repression. This review will necessarily be limited, therefore, to (1) a resumé of the observed facts of amnesia, (2) an analysis of the various theories of amnesia, (3) a survey of relevant research from the psychology of normal memory, and (4) a summary of those principles derived from abnormalities which appear to have some significance for normal memory (and vice versa).

Characteristics of Amnesias

According to Warren's *Dictionary of Psychology* an amnesia is "a functional disorder characterized by partial or total inability to recall or to identify past experiences." In practice the term is applied only to those instances in which there is reason for assuming that a normal individual would not have suffered the loss. Cases as described in the literature vary greatly in their form, conditions of

[1] Obviously many of the intra-organismic conditions have been determined by extra-organismic ones at some period in the individual's history.

occurrence, and content, and it seems doubtful that any one process or set of conditions is responsible for all amnesias. A few characteristics, however, are common to the majority of cases and must be taken into serious consideration in any attempted theoretical explanation of the phenomena.

1. *An Adequate Impression Was Originally Received by the Patient.*[2] Three criteria of adequacy are available: (a) the fact of immediate recall of the experience before amnesia develops (as in the amnesias of murderers, **32**, or victims of dual personality); (b) eventual recall spontaneously or by aid of special methods (as with hypnosis, distraction, chloroform, emotional shock, or free association); and (c) agreement by competent observers that the external conditions were sufficient to provide an impression. The last criterion may be easily abused; perception depends on internal conditions as well as external and no observer is competent to judge the former as adequate. The amnesia of impression, which is in reality not a true amnesia at all, is an inability to recall material which was never adequately learned or perceived.

2. *Neither Instruction nor Conscious Intent Is Sufficient to Initiate a Reproduction of the Forgotten Act or Experience.* Recall, or reactivation of a forgotten habit, may occur spontaneously or by aid of the special methods mentioned above. Instructed or voluntary attempts to recall are frequently accompanied by sudden onset of headache, anxiety, nausea, excitement, or other symptoms of neurosis (**36, 45** [*5*]*, *52*). If the patient is under hypnosis he may come out of the trance (**45** [*8*]), or if recall occurs to questioning other neurotic symptoms may develop (**37**). In instances of amnesias for crimes committed it is extremely difficult to obtain a recall by artificial means; most recoveries are spontaneous and take place very gradually (**32**). Almost uniformly there is a post-recovery amnesia for the original amnesic period (**1, 4, 6, 13, 38, 42, 45, 56**). Recall by free association may best be started by reference to objects having an emotional value for the patient, as, for example, the name of his country, regiment, wife or child, occupation, etc. (**32, 45** [*5*], **50**) or by having him start recall with the events preceding the amnesic

[2] In case of amnesia for other responses than verbal recall of perceptual experiences, *e.g.* stereognostic ability or certain manual and pedal skills like walking, this characteristic might be changed to: *The Behavior Was Originally Adequately Established as a Response to Normal Stimulation.*

* Figures in brackets refer to the identifying number of the case history in the references given.

period (**12, 40** [*94*]). Spontaneous recalls occur at varying intervals from the onset of the disturbance, the majority occurring within 24 hours; recalcitrant cases may persist for several years before recovering (**1, 32, 45**).

3. *Excitatory Tendencies Toward Reproduction in Verbal, Imaginal or General Behavioral Form Are Retained During the Amnesic Period.* This is evidenced by the spontaneous or aided recalls at a later time.

4. *The Motor and Imaginal Reaction Patterns Which Fail to Occur to Normally Adequate Stimulation* (i.e. *Are Amnesic*), *Are Always Associated with Excitatory Tendencies to Emotional Reactions.* In contradistinction to the normal forgetting of unreinforced and relatively unemotional motor or imaginal activities (verbal recall of experiences or facts, imagining of experiences, or such habit patterns as playing the piano), the amnesia covers reaction patterns which have been repeatedly reinforced prior to the amnesic period and either have constituted emotional reactions themselves or have come in conflict with other response patterns. In the latter case the therapeutic excitation of the amnesic reactions sets off an emotional reaction (**36, 45** [*5*], **52**). The emotions most frequently found to have constituted the amnesic reactions (or to have been intimately associated with them) are fear, guilt, shame, disgust, sorrow, and feelings of inferiority (**18, 27, 32, 39, 40, 45, 50, 52**; **79**, p. 34).

5. *The Persistent Stimuli* (*Motives*) *Which Would Normally Activate the Amnesic Excitatory Tendencies Activate Other Excitatory Tendencies During the Amnesic Period in Many Instances.* The phenomena of split or multiple personality (**6, 39, 62**) and the automatisms, fears, hallucinations, or other symptoms of war neurosis and psychosis (**18, 37, 45, 50, 52, 67**) have been traced by nearly all observers to this process. The substitute excitatory tendencies appear, superficially at least, to have been related originally by temporal contiguity with the amnesic excitatory tendencies.

6. *In Certain Descriptive Dimensions Cases of Amnesia Differ Greatly from One Another.*

(a) The *rate of onset* may vary from slow to extremely rapid. The "dissociative type" of amnesia (McDougall, **45**) may set in instantaneously without warning (shell shock or other traumatic amnesias; cf. also **1, 27, 32, 38**), while the "repressive type" (McDougall, **45**, Hopwood and Snell, **32**) may be a gradual loss of

memories reaching its maximum only after as much as 2 weeks following the onset of the process (cf. also **65**).

(b) The *quantity of material* (*responses*) which the patient is unable to reproduce may be very slight or may cover relatively large areas of the patient's experience. Many cases of amnesia for single words, names, or phrases have been reported (**16**; **24**; **79**, p. 34); loss of personal identity (**1**, **18**, **38**, **40**, **42**, **45**), is frequent both in civil and in military life; and there may be losses of whole systems of emotional responses (**8**, **37**, **52**, **67**), or technical knowledge and skill (**37**, **45**, **62**).

(c) The *kinds of material* (*responses*) are not limited to verbal reproduction of past experiences (Prince, **60**). Such phenomena as hysterical astereognosis (Sears and Cohen, **68**) and astasia-abasia are likewise to be considered as losses of previously possessed habits. The verbal type of amnesia is the most common, however, and most writers agree that such cases may be conveniently divided into two general groups: (1) amnesia for all that occurs within a given period of time, and (2) all the material connected with a certain experience or system of events. Frequently a case inescapably falls into both classes; shell shock amnesias, for example, usually cover a certain period of time, a period which coincides also with the system of events involving the patient's participation in the war or in some peculiarly horrible portion of it.

(d) The *external conditions accompanying onset* may be highly stimulating as in the case of an automobile accident (**36**), explosion of a shell (**18**), or the death of a relative (**39**). The onset may occur, however, during a period of apparently low stimulation from external conditions (**6**, **38**, **40**, **62**). No constancy whatever can be observed in the external conditions surrounding the onset of amnesias.

(e) When the onset is temporally associated with a trauma *the amnesia may cover pre-traumatic experiences* (retrograde) for varying lengths of time from a few minutes to many years (loss of personal identity). Although in the majority of cases the patient is able to perceive and learn adequately after the trauma (**1**), *i.e.* during the period when he suffers from amnesia, he may gradually develop an amnesia (anterograde) for post-traumatic events (**32**, **65**); this is particularly true in the case of criminals. Likewise, according to Jones (**40**), a retrograde amnesia may become retroanterograde (*continuous amnesia*) if the post-traumatic events are intimately associated with the pre-traumatic ones.

These characteristics form the barest framework of a non-systematic description of amnesias. The most consistently accepted *inference* among all systematic writers has been the unpleasantness characteristic of the amnesic material. Whether the symptom is loss of knowledge of personal identity, ability at a technical skill, recall of emotional experiences, legal responsibilities, or a moral iniquity, interpretation has been general that reactivation of the amnesic response would involve severe and unpleasant emotional conflict for the patient. Purposivists add that the amnesia represents a striving to protect the ego from discomfort.

Faulty Fixation

Apparent memory loss resulting from a failure of the original experience to be perceived might well be called a pseudo-amnesia, since there is in such cases no memory to be forgotten. The term amnesia is applied only because the patient is known to have been in contact with certain activities of the environment and it is assumed that he should have perceived and remembered them. Hess (**31**) reported 3 cases of retrograde amnesia, 2 resulting from attempted suicide by hanging and 1 from a head injury, which he interpreted to be amnesias of impression (fixation) on the ground that the patients had been drunk or greatly fatigued immediately preceding the traumatic incident. He infers that they did not, therefore, undergo impression of the environmental events. Retrograde amnesias which cover periods of prolonged alcoholic intoxication and do not yield to hypnosis may well be explicable on this basis.

It is possible that experiences of strong emotional value may so distract attention as to produce amnesias of impression for simultaneous events, but no evidence has been adduced for this hypothesis. All reported cases of retrograde amnesia following emotional traumata have shown recovery either spontaneously or through the use of special recall techniques such as hypnosis, free association or abstraction.

Continuous amnesia, an amnesia of retention in which what is experienced is immediately forgotten without the special incidence of physical or emotional traumata, may occur subsequent to carbon monoxide poisoning (**64**) or other organic damage to the brain. When this symptom occurs during the period subsequent to emotional shocks (disorientation) or during the recall of the contents of a reproductive amnesia (**16, 40**) it is an amnesia of reproduction

rather than of retention according to Jones (**40**). *Anterograde amnesia* following an emotional trauma (**5**) likewise appears to be an amnesia of reproduction rather than of impression or retention.

Faulty Reproduction: Retroactive Inhibition [3]

Retrograde amnesias varying in degree of severity from complete loss of personal identity to a forgetting of the events of a three-minute period have occasionally been found subsequent to emotional shocks. More frequently retrograde loss is associated with head injuries, intoxication or strangulation. Although these latter cases have been reported as functional in many instances, largely on the basis of spontaneous recoveries (**12, 14, 15, 73, 78**), they must be ruled out of present consideration on grounds of etiological uncertainty. Examining physicians have often reported neurological signs as negative but the symptoms reported (unconsciousness, vomiting, stupor, headache, delirium) leave room for indeterminate cortical disturbances (pin-point hemorrhage, cerebral anemia and increased intra-cranial pressure).

In an effort to account for both physical and emotional shock amnesias (retrograde) Burnham (**10**) suggested that a twofold classification might be made on the basis of causative processes: (a) the *retrograde amnesia proper* which is a result of dissociation, and (b) *retroactive amnesia* which covers a few moments only and is caused by interference with or arrest of "a physical process of organization and a psychological process of repetition and association" which is necessary for the retention of any experience. Woodworth (**82**), in describing the process of "consolidation" of learned material, presents a similar point of view and includes both shock amnesia and retroactive inhibition as evidences for the existence of such a process. Each has hypothesized a post-formal-practice fixation process and has evidently assumed a perseveration theory of retroactive inhibition. The validity of Burnham's and Woodworth's view depends on a demonstration that the *retroactive amnesia* cannot recover spontaneously or be removed by special techniques, since according to their position this phenomenon is in all essentials an amnesia of fixation (fixation defined in accord with their hypothesis of a post-practice process, not operationally).

While a number of cases of physical traumatic amnesias have been

[3] The writer is grateful to Dr. John A. McGeoch for a number of helpful suggestions in the preparation of this section.

reported which fit this requirement, the writer has been able to discover but one case of emotional origin reported by a psychiatrist of known competence in the use of these special techniques in which no recovery occurred (Coriat, **14** [*Group II, Case 1*]); a retrograde amnesia for a 21 hour period occurred in a young man when he was terribly frightened by a passing train. Coriat reports that ". . . . the lost experiences could not be recalled by experimental distraction with the exception of a hazy memory of passing through a cemetery" (**14**, p. 236). The majority of such cases show spontaneous recovery within 24 hours (**5**, **14** [*Group II, Case 2*]), and of those which require treatment by hypnosis (**1**, **12**, **14**, **45**, **78**) none is reported as uncured. An occasional case of evident emotional origin is reported as never having recovered (**10**, **32**), but in such cases no special aids to recall have been used. Hence although Burnham's view may be satisfactory for physical traumatic amnesias, it rests on very infirm ground in its application to functional amnesias.

The relation between functional retrograde amnesias (or retroactive amnesias; the distinction is meaningless with cases of emotional origin) and retroactive inhibition is nevertheless suggestive. From an operational standpoint they appear to be parts of a continuum; in both the interpolation of a new experience causes a recall-decrement for the original experiences. Crucial evidence of this identity depends on a demonstration that the modification produced in laboratory retroaction is not unidirectional. As has been emphasized above, appropriate techniques are capable of reversing the changes in retrograde amnesias in such a way that no recall decrement remains. If proper instructions (set) or the use of hypnosis or distraction can be shown to remove the effects of interpolated learning there will be strong reason for presenting the hypothesis that retrograde amnesias and retroactive inhibition are degrees of a continuous function.

The fact that emotional reactions induced by electric shock (Harden, **30**, McGeoch, **46**, White, **80**) and unpleasant feelings induced by U odors (Frank and Ludvigh, **20**) can produce some retroaction in laboratory situations lends support to the hypothesis.[4] Further, the frequently observed amnesia for the traumatic experience itself (**1**, **42**) may be a form of proactive inhibition which is related to the laboratory examples of this phenomenon in much the same way that

[4] For a summary of the experimental literature on the relation between emotional stimulation and retroactive inhibition, see Britt (**7**).

it is suggested retrograde amnesia and emotional retroaction are related.

If, as McGeoch (**46a**) has concluded, the temporal locus of the inhibition is in the "measurement of retention," *i.e.* in the reproductive process, speculation is encouraged as to a possible relation between retroaction and the processes of repression and dissociation. As will be seen below, the essence of repressive and dissociative amnesia is the conflict between mutually incompatible excitatory tendencies initiated by the same stimulus. If retroactive inhibition is essentially a conflict between the excitatory tendencies toward a reproduction of 2 sets of material it would not be difficult to suggest the nature of the stimulus-complex common to both—same experimenter, same room, same general recognition that "this is a psychological experiment" with same feelings of interest or boredom. This hypothesis is directly open to experiment and if it should prove true would permit an important synthesis of the principles of retroactive inhibition, repression and dissociation.

Faulty Reproduction: Repression

Psychoanalytic descriptions of repression, particularly those of Freud, have long emphasized the inhibitory nature of the process with reference to instincts or other impulses to action. Freud says, for example, "One of the vicissitudes an instinctual impulse may undergo is to meet with resistances the aim of which is to make the impulse inoperative. Under certain conditions . . . the impulse then passes into the state of *repression.*" (Freud, **22**, p. 84) To non-analytic writers, however, repression has been of interest primarily as an hypothetical technique of forced forgetting. This shift in descriptive emphasis from the motivational to the memorial aspect of the process may be laid to two influences. From the beginning of the psychoanalytic movement English and American analysts have been greatly interested in therapeutic technique. Since resistance, a problem of paramount importance in therapy, involves repression and shows itself partly through critical amnesias, journal discussions have tended to emphasize repression in relation to consciousness and verbal activities. In addition, non-psychoanalytic writers have rejected the Freudian instinct theories, to which repression relates, and in order to salvage a suggestive concept have retained the obliviscence aspect of the process because it could be easily related to the conventional psychological function, memory.

There is justification for rejecting the instinct theories, but there is none for eliminating all consideration of motives or drives in dealing with the problems of memory and forgetting. Such elimination has already brought needless confusion into efforts to study repression experimentally, as is evidenced in certain of the researches designed to measure comparative recallability for pleasant and unpleasant materials.

Since the systematic setting of psychoanalytic concepts does not permit their direct experimental examination by other than psychoanalytic techniques, it seems desirable to restate the repression concept in terms of reaction psychology (as well as to summarize it in its original systematic setting), in order to facilitate the examination of pertinent experimental data.

1. *Freud's Concept of Repression.*[5] Fundamental to repression is the instinct. This is a dynamic force, a source of energy, which demands certain specific actions on the part of the organism. When these actions are carried out the instinct is satisfied and ceases to impel the organism to action. The behavior which results from the instinct's impulsion is natively pleasant and is carried out in accordance with the pleasure principle.

The instinct has two aspects: the quantitative or energic, and the representation in consciousness. The content of consciousness which represents it is composed of two separable parts: there is first the "instinct-presentation . . . [which is] an idea or group of ideas which is cathected with a definite amount of the mental energy (libido, interest) pertaining to an instinct" (Freud, **22**, p. 91); and second, the ". . . *charge of affect* [which] . . . represents that part of the instinct which has become detached from the idea, and finds proportionate expression, according to its quantity, in processes which become observable to perception as affects" (Freud, **22**, p. 91). This relationship is evident in the hunger situation. The "quantitative" part of the instinct is the physiological condition of the organism which leads to so-called "hunger behavior." The instinct is represented in consciousness by the *idea* "I am hungry" plus the (conscious) sensations which accompany that statement, and, since the energic aspect of the instinct is characteristically affective, a *feeling* which is uniquely the feeling of hunger. Since the unconscious is composed of ideas (memory traces) these affects are never unconscious in the systematic sense of the word; they are processes of discharge which exist only as potential dispositions until they become conscious as

[5] For definitions of psychoanalytic terms, refer to Warren's *Dictionary of Psychology;* for more complete descriptions, see Healy, W., Bronner, A., and Bowers, A. M., *The Structure and Meaning of Psychoanalysis.* New York: Alfred A. Knopf, 1931.

feelings. Therefore, Freud says (23, p. 109), "Even in the unconscious, moreover, it [the instinct] can only be represented by the idea."

"One of the vicissitudes an instinctual impulse may undergo is to meet with resistances the aim of which is to make the impulse inoperative. Under certain conditions . . . the impulse then passes into the state of *repression*" (Freud, 22, p. 84). There are three principal resistances which may block an impulse. The first and most rudimentary is flight; the organism can avoid the arousal of an instinctual impulse by fleeing from external situations which stimulate it. "Later on, rejection based on judgment (*condemnation*) will be found to be a good weapon against the impulse. Repression is a preliminary phase of condemnation, something between flight and condemnation; . . ." (Freud, 22, p. 84). *Repression*, then, is the third type of resistance.

In order that repression may occur, the instinctual impulse must be painful: ". . . it is a condition of repression that the element of avoiding 'pain' shall have acquired more strength than the pleasure of gratification" (Freud, 22, p. 85). No instinct is natively painful, however, nor does the mere failure to satisfy the impulse lead to repression (*e.g.* hunger). Therefore the previous gratification of the impulse must have been associated with pain.

The act of repressing is initiated by the ego at a signal from the super-ego (Freud, 25, pp. 1–10; 26, pp. 124–125; Alexander, 2, pp. 8–19). This signal is in the form of a mild attack of conscience-anxiety that results from an experimental cathexis of memory traces of previous occasions on which the instinctual impulse was carried to fruition. It is as if the impulse made a tentative trial at gratification but the ego found the memory of previous gratifications painful (through conflict with the super-ego) and inhibited the impulse.

Repression develops originally from the simple inhibition of instinctual impulses. This inhibition occurs in order to avoid rearousal of the severe objective anxiety and pain which were produced by earlier experiences in which failure to inhibit the impulse was followed by punishment. The super-ego, which gives the signal for repression, is simply an internalization of the restrictive and punitive attributes of the parents (conscience). Objective anxiety is the fear of punishment by parents and, as the conscience develops, this anxiety also becomes internalized as a conscience-anxiety. In order to avoid continuous conscience-anxiety, repression must occur before the unacceptable impulse reaches consciousness, for once the punitive attributes of the parents are internalized the *consciousness*

of an instinct-presentation is equivalent to *acting upon* the impulse in the period before internalization occurred.[6]

Thus it will be noted that ". . . repression is not a defence-mechanism present from the very beginning, and that it cannot occur until a sharp distinction has been established between what is conscious and what is unconscious: that *the essence of repression lies simply in the function of rejecting and keeping something out of consciousness*" (Freud, 22, p. 86). It is quite possible that various other defence mechanisms such as reaction-formation may interfere with the impulse before the technique of repressing is developed.

Which of the three methods of resisting the impulse is used in any specific situation depends on the kind of inhibition which has been developed for that impulse. Flight will occur if an external stimulus is the important factor in actuating the impulse. Judgmental rejection or condemnation will occur if the punitive attributes of the parents have not been internalized; in this case the impulse may be expressed in consciousness without arousing anxiety. Repression occurs when a rigid internalization of these punitive attributes has taken place and consciousness of the impulse would arouse conscience-anxiety.

These facts may be summarized as follows: Repression is a technique for preventing either consummation or a conscious recognition of the existence of an instinctual impulse which, through experience, has become painful when it is allowed in consciousness. The process consists of an automatic and unconscious rejection of the ideational representation of the impulse; this rejection is accompanied by a loss of effectiveness of the impulse to initiate action.

To continue, there are two principal kinds of repression. ". . . *primal repression,* a first phase of repression, which consists in a denial of entry into consciousness to the mental (ideational) presentation of the instinct. This is accompanied by a *fixation;* the ideational presentation in question persists unaltered from then onwards and the instinct remains attached to it" (Freud, 22, p. 86). "The second phase of repression, *repression proper,* concerns mental derivatives of the repressed instinct-presentation, or such trains of thought as, originating elsewhere, have come into associative connection with it" (Freud, 22, p. 86). These associated ideas likewise suffer repression. Most adult repressions are produced associatively by the pull of archaic repres-

[6] Freud (22, 23) originally believed that anxiety was a *result* rather than a *cause* of repression, that the energy of the instinctual impulse was transformed into anxiety by the act of repression. Cf. Freud (26, pp. 124–125) and the discussion below of the fate of the quantitative factor in a repressed instinctual impulse.

sions. "One comes easily into the danger of overestimating the rôle of the super-ego in repression" (Freud, 25, p. 10).

The technique by which these two kinds of repression occur and are maintained is a *preconscious anti-cathexis* of the ideas involved (Freud, 23, pp. 112–114). This anti-cathexis is essentially an active inhibition of the expression in consciousness of the ideas. Primal repression occurs solely as a result of this technique, the repressed ideas never coming into the conscious or preconscious. Repression proper, or after-expulsion, occurs first as a withdrawal of preconscious positive cathexes which then become anti-cathexes; *i.e.* the ideas which are repressed have been present in consciousness but because they become associated with the primally repressed material are thereby repressed themselves.

A repressed instinctual impulse has certain well-defined characteristics (Freud, 22, p. 87 ff.). (a) *It is not represented in its true form in consciousness.* Since the energy (quantitative factor) of the instinct still exists but is merely not permitted to initiate behavior directly or to be frankly represented in consciousness, it may cathect substitute ideas, *i.e.* the affect "is forced to become connected with another idea, and is now interpreted by consciousness as the expression of this other idea" (Freud, 23, p. 110). These substitute ideas seem introspectively to have great importance and various courses of action which are either suggested by or associated with them are carried out with all the energy of the repressed instinct. (b) *The instinct-presentation develops in a more luxuriant fashion than it would if it were conscious,* giving the instinct an illusion of greater strength than it actually possesses. This instinct-presentation is comprised of the (now unconscious) original ideational aspect of the instinct and the (preconscious) substitute ideas adopted following repression of the instinct. This illusory strength appears as a result of two conditions: first, the uninhibited development of (unconscious) phantasy around the subject-matter of the instinct, and second, the damming-up of the instinct which is consequent upon lack of real satisfaction. Satisfaction gained through the activities associated with substitute ideas is only partial (*e.g.* phobias, compulsions). (c) *The resistance of consciousness against derivatives and associations of the instinct-presentation varies in inverse proportion to their remoteness from the ideas originally repressed.* This remoteness from the core of the original instinct-presentation depends on, first, the number of intermediate associations between the core and the idea which is attempting to enter consciousness, and second, on the degree of distortion through which the entering idea has passed. Because this second factor can vary from time to time with varia-

tions in the strength of the repressed impulse, quality of associations available as a result of experience, and degree of extra-organismic excitation of the instinct, (d) *repression is highly specific to each idea and substitute idea.* This specificity is apparent in the analytic situation during which free association leads into the group of repressed ideas. There is variation from moment to moment in the patient's ability to bring certain ideas to consciousness and to express them verbally. Tausk (77) has suggested that two factors aid in reducing resistance. First, the blockage of a directed activity (free association) is somewhat painful and this pain is greater than the pain of expressing a certain repression; second, a compensating pleasurable thought may be expressed just before the resistance disappears and this overbalances the pain of abreaction. (e) *Repression is very mobile;* it does not occur once and for all but ". . . demands a constant expenditure of energy, and if this were discontinued the success of the repression would be jeopardized, so that a fresh act of repression would be necessary" (Freud, 22, p. 89). The continuance of a repression requires less energy and is less painful (*i.e.* arouses less anxiety) than the initiation of such an action (Alexander, 2, p. 14). (f) *The degree of repression varies with the strength of the instinctual impulse.* If the instinct weakens, the instinct-presentation may come into consciousness, but ". . . as soon as an idea which is fundamentally offensive exceeds a certain degree of strength, the conflict takes on actuality, and it is precisely activation of the idea that leads to its repression" (Freud, 22, p. 90).

The two parts of the instinctual impulse have different fates when the impulse is repressed. The instinct-presentation is either kept out or thrown out of consciousness so that the person is not aware that such ideational content exists. The "quantitative" or energic factor has three possible fates. (a) It may be ". . . altogether suppressed, so that no trace of it is found, . . ." (Freud, 22, p. 92); "*i.e.*, its development is hindered altogether" (Freud, 23, p. 110). This is the real aim of repression: the total elimination of an impulse to action. In the normal individual the Œdipus complex probably suffers this fate (Freud, 26, p. 127). (b) It may remain wholly or in part as it is, still capable of initiating the original action associated with the impulse providing repression ceases. (c) ". . . it appears in the guise of an affect of a particular qualitative tone, . . ." (Freud, 22, p. 92). There is

a transformation into an emotion which is qualitatively dissimilar to the original affective tone of the impulse.

A successful repression would be one in which the instinctual impulse suffered the first fate mentioned above, but whether such successful repressions are many or few is unknown since there is no method by which they may be located. It is through an examination of the unsuccessful ones, those in which the impulse suffers either the second or third fates, that knowledge of the process is gained.

When the impulse *remains as it is* ". . . repression can succeed in inhibiting the transformation of an instinctual impulse into affective expression" (Freud, **23**, p. 111). Since consciousness controls both affectivity and motility, and the two processes are closely linked, the prevention of an affective response in this instance is accompanied by a loss in motility, *i.e.* a muscular adjustment to the outer world. This result is characteristic of the psychoses in which consciousness loses control over both motility and affectivity (Freud, **23**, pp. 111–112).

The final possible fate of a repressed impulse, *the transformation into a different affect,* is characteristic of the neuroses. The impulse is expressed in behavior and represented in consciousness, and even though the affect is transformed into a new quality motility is unimpaired. Since the original instinct-presentation cannot come into consciousness without distortion, however, even in association with the transformed affect, a *substitute-formation* is created. But ". . . it is not the repression itself which produces substitute-formations and symptoms[;] . . . these latter constitute indications of a *return of the repressed* and owe their existence to quite other processes" (Freud, **22**, p. 93). The "return of the repressed" results from the constant effort on the part of the instinct to come into consciousness and modify the person's behavior. While these different processes of substitute-formation have different mechanisms (certain of the so-called Freudian mechanisms) they have ". . . one thing in common: *a withdrawal of energic cathexis* (or of *libido,* if it is a question of sexual instincts)" from the original ideational content of the impulse (Freud, **22**, p. 93). The distortion evidenced in dreams and neurotic symptoms is an indication of this substitute process whereby the impulse has been transformed into a qualitatively new affect and in some cases, at least, has adopted a new object (instinct-presentation).

2. Restatement of the Repression Hypothesis.[7] French (21), in his brilliant interpretation of psychoanalytic principles in conditioned reflex terms, has suggested that *rejection* of an impulse is comparable to the normal differential inhibition developed by Pavlov; *i.e.* the organism learns to respond positively toward one stimulus and negatively (inhibition through experimental extinction) toward another which is similar to it. *Repression* occurs, however, when the differentiation is drawn too fine and, as Pavlov has described in cases of canine neuroses (54, p. 284 ff.), an inhibitory response is developed toward both stimuli. This interpretation would probably fit some cases of apparent repression but it does not represent an adequate restatement of the theory of repression nor does it permit the derivation of the several characteristics of the process as described above.

Repression is a method of resolving the conflict between two mutually incompatible excitatory tendencies. Its existence, as an active process, can be determined only if the existence of the two conflicting excitatory tendencies can be verified. If, for example, an adult male whose physiological sexual functions are known to be normal shows no evidence of direct trial and error effort to satisfy his sexual drive, the excitatory tendencies toward sexual action may be described as blocked.[8] The criterion of "direct trial and error effort" in such a case will vary from one individual to another and can be established only by a knowledge of what object has become by experience the adequate stimulus for producing orgasm. Existence of the interfering excitatory tendency must likewise be verified.

This conflict situation is, however, only the fundamental condition for the occurrence of repression. Not all excitatory tendencies can be repressed and not all interfering or conflicting (dominant) tendencies can produce repression. The process occurs uniquely to two kinds of excitatory tendencies: (a) those which may be or have been accompanied by verbal activity which represents them symbolically, and (b) those which lead to verbal activity that is itself mutu-

[7] The writer wishes to express his appreciation to Professor C. L. Hull for reading this section critically and suggesting a number of improvements in the part dealing with the development of repression.

[8] The term "blocked" as here used implies the logical deduction that an excitatory tendency which fails to initiate behavior known to be congruous with that tendency fails as a result of interference from some other process or condition.

ally incompatible with some other verbal activity. Presumably the first type is a special case of the second; *i.e.* the blockable excitatory tendency (a) may or (b) may not lead to other activities in addition to the verbal ones.

The term "verbal activity" is used instead of Freud's "consciousness" because for experimental purpose there must be an objectively measurable response, the lack of which will serve as one of the necessary criteria of repression. It is apparent, of course, that the meaningful content of verbal activity may pass through several developmental (*preverbal*) forms before being finally translated into language. Some of these, like the image, are definitely symbolic and others, more primitive, like the generalized attitude, are not. Tissue needs, for example, are customarily recognized first in the form of unpleasant sensations from various parts of the body. These may be followed by an unformulated and unverbalized desire for change, and this may in turn give way to images of the object which would satisfy those needs. Likewise an attitude of disapproval toward a political theory may develop from the conjunction of many isolated and in themselves politically meaningless experiences which together lead to a general dislike for the proponents of the theory and, by association, for the theory itself. This attitude may persist over a substantial period of time, constantly influencing political behavior, before it is translated into verbal activity by use of an attitude scale or a simple statement. These various *preverbal* forms of the content must be translated into verbal symbols and expressed in some objectively measurable fashion in order to be equivalent to the Freudian "consciousness of an impulse."

One proviso must be made. If this equivalence is accepted it is necessary that *all* of these verbalizable but non-verbalized forms of content be finally expressed in measurable verbal terms. There are, of course, many factors which may interfere with the expression of conscious images, attitudes, or wishes in words. A man may frankly wish that he had a different profession but under a few conditions only will he translate this wish into verbal terms that an observer could measure. Such factors as alcoholic intoxication, extreme anxiety, sympathetic intimacy with the recipient of the information, or some other strong social polarization might be the only influences which would lead to this translation. It is clear that in order for the above description to be truly reflective of the Freudian position there must be a one-to-one relationship between the unexpressed content (verbal or preverbal) and the expressed (measurable) content of the verbal activity itself.

This proviso may seem to emasculate the suggested restatement of consciousness as verbal activity. It is evident that from an experimental viewpoint the restatement is required; there must be an objectively measurable response the quantity or quality of which will provide a criterion of the form or extent of blockage. It is equally necessary, since repression is limited to those impulses the *coming into consciousness* of which produces conflict, that this response

shall be strictly representative of the subjective condition. It would seem a logical impossibility to provide an objective proof of this objective-subjective relationship and for the present the experimentalist will have to assume, in any given case, that he has obtained in verbal responses a true reflection of the relevant conscious images or other unverbalized content. This assumption will be valid only if he recognizes and overcomes the influence of the incredibly great number of social situations which act as external inhibitors for verbalizing processes that deal with social and emotional contents.

The process of repression, then, refers to the blockage of an excitatory tendency toward verbal activity; this blockage is evidenced in the experimental situation by, first, verification of the existence of the excitatory tendency as a potential initiator of action, and second, by a known lack of the congruous verbal action.

It is evident that not all impulses which suffer blockage are repressed. The decision to express agreement or disagreement with a scientific hypothesis involves the choice of one of two incompatible responses, but once the choice is made the discarded response loses its relevancy. Until further evidence is presented, requiring a new decision, there is no impulse to make that response; the action itself has destroyed the motivation for the rejected response. Furthermore, the symbol of that response remains in consciousness and can be translated into verbal form that may be expressed as an integral part of the memories concerning the making of the decision; *e.g.* "Your hypothesis was phrased in such a way that I thought at first I disagreed with you, but then I understood it more clearly and decided you were right."

Blockage of impulses sometimes occurs also as a result of temporary conditions in the physical or social environment. One may feel strong resentment at a traffic officer's admonitions but judge it unwise to remonstrate in kind for fear of being arrested. The verbal activity which would normally occur in response to such treatment is not repressed but is simply retained in consciousness and is available for ready recall and expression later when the threat has vanished.

Repression occurs only when the interfering excitatory tendency derives from the group of habits which relate to conscience and the maintenance of self-esteem. These habits are inhibitory in the sense that, if they are in conflict with other reactions, they are ordinarily dominant and serve to frustrate excitatory tendencies leading to conflicting responses.

This frequent dominance probably derives from the facilitating influence of what Alexander terms "conscience-anxiety." While it is difficult to describe conscience and self-esteem in terms either of overt behavior or of some unitary motivation, both groups of habits may be clearly recognized by the effects of their frustration. Like the morals of Hamlet's Denmark, they are more honored in the breach than in the observance. Feelings of guilt, shame, and self-criticism result from frustration of conscience habits, and the feeling of inferiority or inadequacy is a sign of a frustrated activity which is linked to the need for self-esteem. "Conscience-anxiety" may be construed as identical with these various frustration reactions.

In neither of the conflict examples above does the interference derive from conscience or self-esteem habits. It is possible, of course, that *verbalized recall* of the submissive reaction to the policeman might lead to some injury of self-esteem, particularly if the victim's self-esteem were unduly sensitive as a consequence of some real social inadequacy. In that case recall of the experience might well undergo repression.

Repression may be presumed to occur, then, when the interfering excitatory tendency is one which leads to a verbal or preverbal action identified with the group of conscience or self-esteem habits. Experimental evidence that a given impulse belongs to this category depends on the demonstrated arousal of feelings of guilt or self-criticism when it is frustrated.

It is apparent from this conclusion that all excitatory tendencies are not susceptible to repression. Only those which have associated with them responses that would be incompatible with conscience or the maintenance of self-esteem can be repressed. Thus there is no reason to assume, on the basis of the repression hypothesis, that there would be any decrement in recall for the names of unpleasant odors or colors simply because they were judged unpleasant.

Unpleasant or painful experiences may well *support* these activities in some instances; it is rare indeed that a person will forget his painful experiences during an heroic rescue of a drowning child or an emergency operation undergone bravely without benefit of anesthesia. In this connection it is interesting to note Stratton's discovery (**76**) that many people who suffered shocking and frightening experiences during the San Francisco earthquake had an hypermnesia of recall for them years later; personal contiguity with an important event provides a rather satisfying vicarious importance in any social group.

It is clear, further, that there must be individual differences in the excitatory tendencies which are subject to repression. The variation in the content of consciences is apparent even in fairly

homogeneous cultures and there are as many different methods of maintaining self-esteem as there are human beings.

An excitatory tendency may be repressed if, when it is carried to fruition, it blocks a habit related to the conscience or self-esteem. Its characteristics in this respect may be determined experimentally either by, first, increasing its strength artificially and discovering whether there is concomitant occurrence of the frustration reactions (guilt, etc.), or second, measuring directly the strength of excitatory tendencies toward self-esteem or conscience responses which would be frustrated by the impulse if carried to fruition; if this strength is zero the excitatory tendency is not susceptible to repression.

The development of a repression may perhaps most easily be described by reference to a series of diagrammatic formulae similar to those devised by Hull for analyzing the learning process (**33–35**). It may be supposed (Fig. 1) that a persistent stimulus

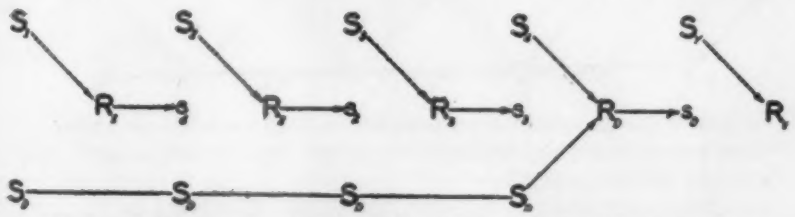

FIGURE 1.—The sequence of stimuli and responses leading eventually to the consummatory response (R_D) which removes the persistent drive stimulus (S_D). Associated in time with the stimuli arising from the consummatory response (s_D) is punishment (S_γ) giving rise to pain responses (R_γ).

such as the sex drive (S_D) is associated in time with a series of acts (R_1, R_2...) initiated by external stimuli (S_1, S_2...). These acts and stimuli lead eventually to the act which releases the tension of the sex drive (R_D) and removes the drive (S_D). This act (R_D) is followed by parental punishment (S_γ) with a consequent reaction of anxiety and attempted avoidance on the part of the organism (R_γ).

A later occurrence of this stimulus-response sequence (Fig. 2) will find an acquired excitatory tendency (as indicated by the dotted lines) between S_D and the various responses contained in the sequence. Likewise, anticipatory responses (r_D) which can be carried out without conflict with R_1, R_2... occur to S_D (Hull, **35**). Since S_D ceases

with the consummatory response R_D it acquires a relatively weak, remote excitatory tendency directly to R_γ. Each response may be supposed to give rise to interoceptive and proprioceptive stimuli (Hull, **34**) and these in turn have become conditioned to subsequent reactions.

In Fig. 2 it is assumed that the various acts (R_1, R_2...) leading to R_D are not essential for the occurrence of the consummatory act (R_D), and have gone through a process of reduction which leaves them in the form of pure-stimulus acts (Hull, **34**). These acts,

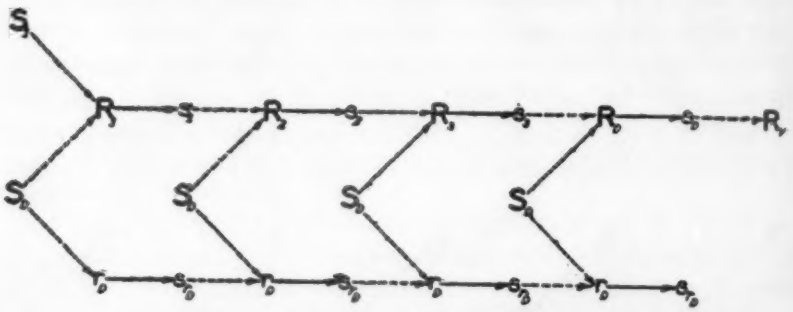

FIGURE 2.—After the sequence shown in Fig. 1 conditioned excitatory tendencies (indicated by the dotted lines) are established from the drive stimulus to the anticipatory goal response and from the interoceptive stimuli arising from R_1, R_2 (s_1, s_2) to the immediately subsequent responses (R_2, R_3). Thus the entire sequence may be carried through, including the final pain-response, by presentation of either the drive stimulus or S_1.

according to Hull (**34**, p. 518, footnote), are largely vestigial and may form the bases of imagery.[9] Thus the presence of the drive stimulus can set off the sequence of images or other preverbal pure-stimulus acts. These will at first lead to the consummatory act which in turn will be followed by pain. If, however, the consummatory act itself becomes reduced either by chance factors or by a temporal irradiation of inhibition from the preceding acts in the sequence, no punishment (S_γ) will follow. As a result the interoceptive stimuli arising from R_D will be insufficient to produce R_γ. This sequence of events can occur *provided* that the punishment and its consequent reaction have been relatively weak, since *it must be possible for the*

[9] This relationship is assumed in the present analysis, although Professor Hull meant it as a tentative suggestion only; its value in the present formulation is apparent.

stimulus arising from R_D to become too weak (when the response is reduced) to initiate R_y.[10]

This situation is descriptive of the "rejection or condemnation" procedure described by Freud.[11]

Repression may occur, however, if the stimulus S_y (parental punishment) is very strong, permitting the formation of a powerful redintegrative complex following the consummatory act. A further elaboration of acquired excitatory tendencies, such as that shown in Fig. 3, will occur. Internal stimuli arising from r_D, the anticipatory

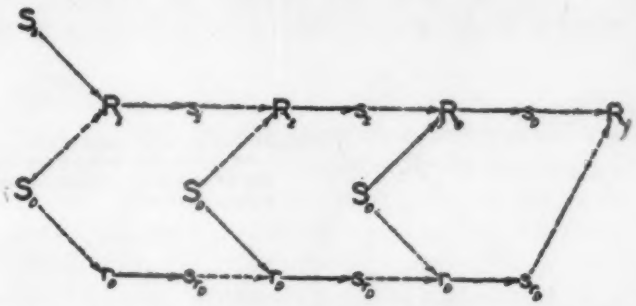

FIGURE 3.—As a result of carrying through the sequence as shown in Fig. 2, the interoceptive stimuli arising from the anticipatory goal response (s_{rD}) develop an excitatory tendency toward the pain-response (R_y). (The segment R_s has been eliminated in this diagram to facilitate reading.)

response to R_D, will acquire an excitatory tendency toward R_y, the anxiety response. Upon still further repetition (Fig. 4) of the sequence these stimuli will give rise to anticipatory responses to R_y (r_y).

In any complex human behavior such as that connected, for example, with the sex drive, the various intermediate acts between initial

[10] Newhall and Sears (53) have shown that, given a constant strength of the unconditioned stimulus, the probability of occurrence of a conditioned response varies with the strength of the conditioned stimulus. Presumably the obverse of this proposition would hold: that given a constant strength of the conditioned stimulus, the probability of occurrence of a conditioned response varies with the strength of the unconditioned stimulus.

[11] It is important to note that the remote excitatory tendencies from S_D to R_y, developed in the manner of trace conditioned responses, provide even in the case of "rejection," for a slight conflict between $S_D \longrightarrow R_D$ and $S_D \longrightarrow R_y$. Thus "rejection" is to some slight extent a form of repression as described below.

stimulation and final consummation are composed of constellations of contributory acts. Among these are various characteristic patterns of internal behavior deriving from activity of the autonomic nervous system. There is substantial evidence to indicate that such patterns associated with sex behavior are quite different, in one sense almost the opposite, from patterns associated with anxiety and the various responses to physical punishment. The excitatory tendency $s_{rD} \longrightarrow r_y$ will, then, lead to a response which is incompatible with the contributory act r_D, and this latter will be frustrated.[12]

Such a frustration may lead to the elimination of the group of images which forms the pure-stimulus acts R_1, R_2 . . . from either

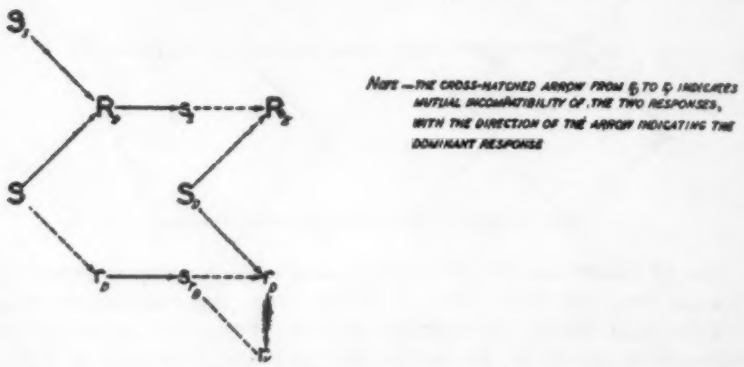
NOTE — THE CROSS-HATCHED ARROW FROM r_D TO r_y INDICATES MUTUAL INCOMPATIBILITY OF THE TWO RESPONSES, WITH THE DIRECTION OF THE ARROW INDICATING THE DOMINANT RESPONSE

FIGURE 4.—The repression sequence. The anticipatory response to the pain-response has been conditioned to s_{rD} by the occurrence of the sequence as in Fig. 3 and is now in conflict with r_D. The cross-hatched arrow from r_D to r_y indicates mutual incompatability of the two responses, with the direction of the arrow indicating the dominant response.

one of two causes: first, because the excitatory tendency $S_D \longrightarrow r_D$ becomes an inhibitory tendency [13] through frustration, and the inhibition irradiates to other excitatory tendencies arising from S_D; second, because with the frustration of r_D no further internal stimuli can arise from it (s_{rD}), and as a consequence the patterning of the stimuli which have for a long time been associated with these internal stimuli breaks down. Hull has suggested (35, p. 500) that there is good reason to believe that when a highly organized stimulus pattern is

[12] The frustrating excitatory tendency will be somewhat reinforced by the remote excitatory tendency $S_D \longrightarrow R_y$ as well.

[13] This inhibitory tendency is equivalent to Freud's "preconscious anticathexis."

broken up *as a pattern* the various component stimuli lose their ability to initiate the acts previously initiated by them as parts of the pattern.

It would appear from this analysis that the strength of punishment is the factor determining whether a given behavior sequence will eventually suffer repression or merely be rejected.

The elimination of the imaginal or other preverbal pure-stimulus acts is essentially the process of primal repression.

Certain deductions which may be made from this restatement of the hypothesis are consonant with the characteristics of repressed impulses as given in the preceding section on the Freudian concept; the lettered paragraphs below correspond to the ones beginning on p. 242.

(a) The drive stimulus to a repressed excitatory tendency may be associated with a number of other excitatory tendencies and their external stimuli during the development of the behavior sequence which is finally repressed. It will have acquired the ability, therefore, to produce responses which are seemingly irrelevant and which do not in fact lead to the consummatory response (R_D). Since these may have had a purely fortuitous temporal relationship to occasional repetitions of the sequence $S_D \longrightarrow R_D$, they have not formed a constellation with R_1 and r_D and therefore are not inhibited by r_y and do not require s_{rD} in order to be set off. These sequences might be termed "substitute" responses. If the *drive* is spoken of as repressed (the Freudian concept) it is apparent that these seemingly irrelevant and unsatisfying behavior sequences will appear to be symbolic representations of the drive, *i.e.* distortions.[14]

(b) If the drive is one which derives from physico-chemical conditions it will ordinarily persist, as does the sex drive, until those conditions are changed. The drive stimulus will therefore persist over a greater period of time if it does not lead to the consummatory response than if it does. As a result there is opportunity for the initiation of a greater number of substitute responses than there would be if S_D were removed by a sequence of acts leading to R_D.[14]

(c) As a result of repeated blockage of the excitatory tendency $S_D \longrightarrow r_D$ an inhibitory tendency will develop in its place. It may be hypothesized that the greater the degree of association between

[14] In a personal communication to the writer, Dr. Hull has pointed out that "the terminus of these seemingly abortive act sequences must have somehow acquired the capacity to serve as reinforcing agents—otherwise the sequences would suffer experimental extinction."

this sequence and "substitute" sequences, in terms of the conventional measures of associational strength, the greater will be the irradiation of inhibition from the former to the latter.

(d) It is to be expected that momentary variations in the strength of the excitatory tendency $S_D \longrightarrow R_y$ will permit variations in the *effective* strength of the excitatory tendencies from S_D to the different "substitute" responses. Their *actual* strengths might well remain fairly constant.

(e) The drive may serve as a stimulus to the consummatory response and at the same time be a stimulus for its repression. In Fig. 4, S_D has acquired an excitatory tendency toward r_y, which is incompatible with and blocks the constellation r_D (R_1, R_2 . . .); this constellation, however, is essential for the activation of R_D. Therefore every time S_D occurs there will be an excitatory tendency toward R_D but the process of repression will likewise be set in motion. Thus repression becomes, in Freud's words, a "mobile," dynamic process, initiated with each stimulation of the to-be-repressed behavior.

(f) The greater the strength of the drive stimulus (S_D), the greater will be the excitatory tendency to r_y and the inhibitory tendency to r_D. With decrease in the strength of S_D the difference between the strength of these two tendencies will be less and may even approach zero. Theoretically the inhibitory tendency $S_D \longrightarrow r_D$ (R_1, R_2 . . .) might lose its inhibitory characteristic through failure of the weakened excitatory tendency $S_D \longrightarrow r_y$ to block it, thus permitting finally a recurrence of the total behavior sequence $S_D \longrightarrow R_D$. R_D, however, leads directly to R_y and the recurrence of this anxiety response will strengthen once more the excitatory tendency $S_D \longrightarrow r_D \longrightarrow s_{rD} \longrightarrow r_y$. In this event the repression process will again be made effective as a response to S_D.

Repression proper (after-expulsion) can occur only when a primal repression sequence has already been developed. If either a new stimulus in the outer world or a verbal symbolic stimulus (S_x) should be placed in temporal juxtaposition to the drive stimulus (S_D), which is already an adequate stimulus to a repression sequence, this new stimulus will by simple conditioning become able to initiate an act of repression itself.

Finally, the phenomenon of *transference* in the psychoanalytic interview can be deduced from this formulation. If, through appropriate stimulation, the verbal sequence (pure-stimulus acts R_1, R_2 . . .) is carried through, the affective responses which presumably form

parts of r_D will occur likewise. These will in turn become associated with any stimulus object (*e.g.* the psychoanalyst) which is contiguous to the redintegrational complex. Indeed it is this phenomenon of transference, so entirely maladaptive from any point of view of permanent social adjustment and so utterly useless for any purpose but that of a criterion of therapeutic progress, that emphasizes so clearly the nature of repression as a strictly stimulus-response process.

3. *Data Relevant to the Repression Hypothesis.* The mass of evidence in favor of the repression hypothesis is derived from the psychoanalytic technique. To what extent the induction of such a principle is justified from the obtained free association is impossible to judge from an objective standpoint, since such material has always proved too bulky for publication in its complete form.[15] From the unanimity of its acceptance among psychoanalysts it may be inferred that, given the psychoanalytic systematic and situational setting, the operation of the process is demonstrable. As in the case of any scientific fact, however, there is the possibility of its being a methodological artifact, and for this reason experimental examination of the principle with other than psychoanalytic techniques has been undertaken by several investigators.

Although several attempts have been made to relate studies of the effects of feelings on memory to the repression hypothesis, such interpretations are open to serious error. First, no distinction has been made between the two very different processes of primal repression and repression proper, and second, a false assumption has customarily been made concerning the identity of U activities with repressible activities. The invalidating effect of this latter error has been strongly emphasized by Rosenzweig (66).

Cason's able and exhaustive analysis of the feeling-memory literature (11) obviates the need of dealing with individual studies in detail here. In general they may be classified in 3 groups: (a) studies of efficiency of recall or recognition of material judged P and U by either the experimenter or subjects, (b) studies of efficiency of recall or recognition of material experimentally associated with P and U material, and (c) studies of efficiency of recall of P and U personal experiences.

Group a. In primal repression the excitatory tendency toward

[15] Two case studies by Erickson (16, 17) give exceptionally detailed presentations of the free associational analysis of amnesias; Jones (40) gives a useful but less complete description of a case.

recall must come into conflict with and be blocked by an excitatory tendency toward a response which is incompatible either with the act of recalling or with some response that is associated in a constellation of responses with the act of recalling. Both excitatory tendencies are stimulated by the same stimulus (S_1 or S_D in the diagrams above). Since the words or pictures judged U in the studies in this group are obviously not drive stimuli, they must be assumed to constitute S_1's and to have been at some time associatively connected with a drive stimulus which became the adequate stimulus for a repression sequence. In no case, however, has any evidence been presented that would indicate such a previous association had existed. The briefest examination of original sources demonstrates that Freud's "unpleasant" is altogether different from the "U" of affective psychology, but the terminological similarity has apparently been the basis for the assumption that U words, for example, must necessarily have been associated with drive stimuli leading to repression sequences.

Such factors as esthetic instruction, social convention, mediate or immediate association with bad tastes, odors, and nausea, or with accidental injuries of a relatively mild order, may easily lead to a judgment of U, but none of these is indicative of a repression sequence or, indeed, bears any noticeable relation to repression. It is entirely possible that a word which would be judged P on the basis of recent literary experience or esthetic instruction would nevertheless be a true stimulus to repression through an association developed in childhood. As Alexander has pointed out, many adult repressions result from early training that was important only at the time and the repressions persist without having adjustment value in adulthood. Therefore a stimulus object effective for initiating a repression sequence might easily have become P through some more recent connection.

Peters (55), in his elaboration of Carr's judgmental theory of pleasantness and unpleasantness, suggests that the judgment of P or U is an indication of the direction of the *normal reaction tendency,* approach or avoidance, toward the object and that the same factors which lead to judgments of P and U influence the efficiency of recall for the words or objects so judged. When P or U words are learned, however, and later recalled, a *special reaction tendency* is established which makes all the words P in the sense that they all require "approach" reactions. (This would be particularly true in the case of such mild P and U feelings as result from esthetic judgments that bear no determinable relation to the powerful conscience and self-esteem excitatory tendencies). The preponderance of P items in the recall is given as evidence that the special reaction tendency (P) does

not overcome completely at least a few of the normal reaction tendencies toward occasional U items.

If this group of studies is considered with reference to *repression proper* a somewhat similar criticism may be made. In this case a verbal activity (recall of a word) must become associated with, and share the blockage of, a repressed excitatory tendency. The assumption has evidently been made, tacitly if not overtly, that if an item is judged U it is in some peculiar way more susceptible to such an association than if it is judged P. It need hardly be said that there is no justification for such a distinction. Indeed, such mildly sexual stimuli as the words *kiss, love, romance,* risqué stories, and motion pictures of love scenes might all be judged P on the basis of adult experience and at the same time be closely associated with activities susceptible to repression, since sex behavior is probably more frequently repressed in childhood and adolescence than that resulting from any other drive. The normal reaction tendency as displayed in the laboratory undoubtedly is influenced by social and intellectual conventions. The P and U judgments for a repression experiment might be more to the point if made by a subject in a psychoanalytic interview after the prolonged development of transference and presumed removal of adult reaction tendencies.

Group b. The same errors of interpretation invalidate the studies in which recall was tested for nonsense syllables, words, and photographs experimentally associated with P and U odors, experiences, and names.

Particularly is this true of the experiments by Gordon (**28**) and Anderson and Bolton (**3**) in which P and U odors were associated with verbal symbols. An odor may well be judged P, *e.g.* a fine perfume, but at the same time be intimately associated with an embarrassing and guilt-inducing experience. U odors which are unfamiliar (*e.g.* asafetida) may have no associations whatever beyond the ones developed in the laboratory. The perfume (P) might provide an immediate after-expulsion for the attached verbal symbols while the U odor's associations could not possibly undergo repression. In such a case there would be greater decrement in recall for the P words than for the U. The probability of equivalent previous associations for both kinds of odors must be accepted until evidence is forthcoming that one or the other is more frequently associated as S_1 with repression sequences.

Group c. The recall of personal experiences which have been rated P or U is of little more significance for the repression hypothesis than the types of studies described above.

Wohlgemuth (**81**) and Meltzer (**48**) had groups of students write lists of their holiday experiences on the first subsequent school day. These experiences were rated P or U and 10 days and 14 days later (Wohlgemuth) or 6 weeks later (Meltzer) the same task was repeated. Certain minor differences in technique between the 2 experiments are unimportant in the present connec-

tion. Wohlgemuth found no difference in efficiency of recall for P and U experiences, while Meltzer found a clearly greater obliviscence for the U.

In these experiments, as in the others, no distinction is made between the various possible kinds of U experience. All are lumped together without reference to the type of emotional reaction aroused.

Further, it seems distinctly improbable that Wohlgemuth obtained a complete list of holiday experiences. That children between 11 and 16 years of age, in the schoolroom setting and faced by the head-mistress, should voluntarily write descriptions of all their experiences which induced severe feelings of guilt or shame is almost incredible, and since only those situations involving a blow to moral standards or to self-esteem are susceptible to repression it would appear that the data have little if any value. Cason (11) has pointed out further that Wohlgemuth's technique measures not only the availability to recall of the P and U experiences but, in part, the ability of his subjects to recall what they had written 10 or 14 days previously. Meltzer's study was based on the experiences of 88 college students and it seems probable that he was more successful than Wohlgemuth in getting a fairly complete account of the holiday activities (cf. discussion of Stagner's study below).

The following general criticisms of the bulk of the experimental literature on the relation between feeling and memory may be made in so far as its relevance to the repression hypothesis is considered:

1. The assumed identity of *U items* and *items which can induce primal repression* is an entirely false assumption. No evidence has been adduced that there is any degree of correlation between the two.

2. The *a priori* assumption that U objects or words are more apt to have been previously associated with behavior sequences in which repression occurs, thus making them more susceptible than P objects to repression proper, is unwarranted; there is reason to believe that associates of many P items (*e.g.* odors) would be more susceptible to after-expulsion than the associates of many U items.

3. In experiments involving recall of personal experiences it is doubtful whether many of the experiences which normally lead to repression were present in the original descriptions of experiences; only under rather exceptional experimental conditions can it be expected that subjects will describe those experiences which have a sufficiently strong emotional association to make for repression.

Five experiments are directly relevant to the concept of primal repression.

Koch (41) gave 10 ten-minute quizzes to 3 equivalent classes in educational psychology over a period of 23 days. Each quiz, graded with a percentage value, was returned at the next meeting of the class after the quiz, and the

subjects were instructed to mark it on a scale of 1 to 5 to indicate their reactions to the grade received in terms of the dimension "very happy—discouraged." The papers were at once returned to the instructor. After the tenth quiz no further examinations were held and 5 weeks later the subjects were unexpectedly asked to recall all 10 grades. The total group was divided into those who had and those who had not kept a written record of their grades. Both groups recalled the "1" grades best; the former subjects recalled the "5" grades second best while the ones who had no record recalled the "2" grades second best. Indifferent grades were remembered most poorly.

The act of recall may be considered as leading to the repression sequence since presumably the ratings of "discouraged" indicated a frustration of self-esteem. The greater recallability of "very happy" grades may be interpreted as evidence that some process similar to repression was operating. It is clear, however, that other factors were of even greater importance, for the "5" grades were remembered better than the indifferent ones. Dr. Koch suggests that those who kept a record of their grades were more concerned with their standing than were the ones who did not, and it may be further assumed that the "discouraged" grades had a greater valence in controlling the behavior of the former group than they had with the others. Likewise, the term had not ended and the need for good grades (ergo, the importance of bad ones) was still an important motive. If Dr. Koch's interpretation of the reason for keeping a record of grades is correct, the 2 sub-groups could be said to vary systematically in terms of the current importance (vividness) of the "discouraged" grades. As would be expected, the group in which these were most important as controllers of current behavior recalled them better than did the group in which the grades had less importance. Dr. Koch's study indicates that some such process as repression was operating but that its importance was relatively small in comparison to the processes involving adaptation to immediate needs (vividness factors).

Stagner (74) gave 101 subjects a mimeographed sheet on which blank lines were provided for a brief description of the most pleasant and most unpleasant experience of the preceding 15 days. Below this were provided 10 lines for as many items (such as odors, sounds, images, etc.) associated with the experiences as the subjects could note down. Three weeks later a typewritten copy of his description was handed to each subject on the same kind of sheet; the list of associated items had been left off and the subjects were instructed to fill in as many as they could recall. The number recalled was taken as a measure of the degree to which the experience could be redintegrated. A greater percentage of the items associated with pleasant experiences than with the unpleasant was recalled, the difference being 3.37 times the

sigma of the difference. Since the original experiences had occurred on an average of 7.6 days preceding initial recall for the pleasant and only 5.8 days for the unpleasant (critical ratio 2.99) the factor of recency would tend to minimize the true difference in recallability.

Here, as in Koch's study, the stimulus for the repression sequence was an external one, viz., the instructions to recall. The materials recalled, however, provide a much finer measure of recallability for the incidents than do the materials of Wohlgemuth's and Meltzer's experiments, for in this case there is a measure of the *degree* of reinstatement of a single experience. Since the technique itself reinstated the original incident, any repression would naturally operate to minimize the number of associated items in the recall.

Rosenzweig and Mason (**66**) had 40 children attempt to solve a series of jig-saw puzzles. Each subject was taken individually and was informed that he was contesting with the rest of the group for a prize. A picture of each puzzle in its completed form was shown him for a half-minute before he started. Different amounts of time were allowed for the various puzzles, allegedly because of their varying degrees of difficulty. The subject was allowed to complete half the puzzles he attempted but was forced to fail on the other half "because the time was up." The actual amount of time spent on the puzzles was equal for the completed and uncompleted ones. After 45 minutes of puzzle-solving the subject was stopped and asked to recall the names of the puzzles he had done and attempted. Recall was somewhat better for those on which he had succeeded than for those on which he had failed.

Zeigarnik (**83**) has shown that the names of uncompleted tasks are ordinarily better recalled than those of completed ones, and McKinney (**47**) has shown that the degree of learning of an uncompleted task is better retained than the degree of learning of a completed task. In spite of these reverse tendencies in recall and retention, Rosenzweig's subjects recalled the completed puzzles better, and it may be assumed that the true difference was even greater than the difference he found, since the experimental technique prejudiced the results in favor of a better recall for the uncompleted tasks. The chief difference between Rosenzweig's situation and that of other experimenters on the recallability of uncompleted tasks lay in the developed attitude of "succeeding" or "failing." Further evidence that this frustration of self-esteem was in part responsible for the results was found in the relation between the tendency to forget uncompleted puzzles and ratings of the subjects on "pride"; the proudest subjects showed the greatest tendency, although the ratings were so unreliable as to be worthless as anything but subsidiary pointers.

Flanagan (**19**)[16] devised 2 sets of 15 paired associates (nonsense syllables) in which the second member of the pair for each set was the same. In one

[16] The writer is greatly indebted to Professor A. G. Bills for the loan of the 2 unpublished studies on repression by Flanagan (**19**) and Sharp (**71**) carried out under his direction at the University of Chicago.

list the conjunction of the first and second syllables presented a meaningful word with a sexual connotation (*e.g.* piy—nis) and in the other a rural connotation (*e.g.* har—nis). Fifty-six university students divided into control and experimental groups learned the 2 sets of associates to a criterion of one perfect repetition. Each subject was taken individually, learning the associates by pronouncing them aloud in the presence of 2 experimenters, a man and a woman. The salacious material required 13.85±.79 trials for learning and the non-salacious control 7.78 ±.45 trials. The difference is 6.7 times the probable error of the difference. Recall was measured following each of the first 3 trials and the critical ratios (P.E.) of the differences between the 2 sets of syllables were 3.5, 3.9, and 3.9.

A similar technique was used by Sharp (71). She prepared 4 lists, however, 2 experimental involving religious and profane meanings when the paired associates were pronounced together, and 2 control which had neutral (unemotional) meanings. One hundred and fourteen women students were divided into equal experimental and control groups. Four serial presentations each followed by a recall test were given the first day; 24 hours later recall was again tested and the lists learned to a criterion of one perfect repetition. The average number of trials required to learn the 2 experimental lists (religious and profane) was 13.10 ±.50 and the control lists (neutral) 6.25 ±.28. The difference is 11.95 times the P.E. of the difference. Recall after 24 hours showed a similar difference in favor of the control series, the critical ratio being 4.83.

Although these studies show a consistently greater efficiency of recall for the neutral than for the sexual, religious, and profane lists, the writers give ample evidence that the conditions of the experiments were not satisfactory for obtaining a measure of any repression that may have occurred. In order to measure the occurrence of primal repression it would be necessary to be certain that the decrement in learning and recall was not the result of embarrassment or shame in the social milieu of the experiment. Exactly this condition is reported by both authors. Miss Sharp reports that about two-thirds of her subjects "pronounced the profane syllables correctly at first, but with the recognition of the sound of the taboo material they immediately changed and distorted the pronunciation." And again: "Openly, suddenly, and in strange tones of voice, with behavior exhibiting embarrassment, subjects gave up trying to conceal their knowledge of the nature of the material and quickly learned the material." Flanagan noted that the presence of a woman stenographer made it very unpleasant for the subjects to speak out the sexual words. It was pointed out in the previous section that in order to use verbal activity as a criterion of consciousness in testing or studying the concept of repression it is necessary that all conscious processes relevant to the situation be expressed in overt speech or by some other objec-

tive method. Although this requirement has not been met in these 2 studies, it seems probable that their ingenious technique could be slightly modified and made appropriate for this purpose.

Stone (75) performed an experiment which seems directly applicable to the hypothesis of repression proper (after-expulsion). Twelve subjects made a list of 24 people of whom half were very much liked and half cordially disliked. A month later the subjects were unexpectedly shown a series of portrait photographs to the first 12 of which the names of the 12 liked persons were attached by oral presentation. Immediately following the same procedure was applied to the names of the disliked persons. With half the subjects this order was reversed, the disliked persons' names being presented first. Immediate recall for the 24 names was tested by presentation of the pictures in a random order. Of the 12 subjects, 7 recalled more names of liked persons correctly, 2 recalled more disliked, and 3 recalled an equal number of each.

It must be assumed, if this experiment is to be interpreted with reference to repression, that (a) those people who were disliked had injured a subject's self-esteem or were associated in some manner with a guilt-inducing experience; and (b) hearing a disliked person's name was a sufficient stimulus for setting off the repression sequence. Both assumptions are probably true to some extent and in some cases. Nearly all damage to self-esteem occurs through the agency of other people, and the name of a person is as significant a part of his identity as anything. Unfortunately no measure of the learning of the association between names and pictures is presented and the data have little value for the theory of repression without it. If repression were operating in this situation, the pictures presumably became substitutes for the original S_1's and acted as stimuli to set off a repression sequence which included the names of the disliked persons.

Discussion. Evidence concerning the repression hypothesis which is derived from these experimental studies is slim indeed. The method common to all has been the establishment of the primary conditions under which repression is believed to occur and an objective test of the recall process to determine whether the supposed results of repression do occur. With as complex an hypothesis as this the leap from primary conditions, which are none too well defined in any case, to final results is risky. In 2 of the experiments (Koch, Stone) a factor known to influence the measure used as a criterion of repression (decrement in recall) has been left uncontrolled; in neither study was the *degree of initial learning* equated or measured for the experimental and control materials. The conditions of Rosenzweig's

experiment were such that although no actual measure of this factor was made, the probabilities of equality are great. A fundamental characteristic of the recall, that it be a *complete verbalization of preverbal content,* was not taken into consideration in the experiments of Flanagan and Sharp, and a fundamental characteristic of the conditions of occurrence of repression, *the specific nature of the repressible material,* was not entirely fulfilled by the experiments of Stagner and Stone.

With the exception of Rosenzweig's study, all the experiments fail in some specific way to meet the requirements either of the hypothesis or of adequate experimental method. Rosenzweig's experimental conditions appear to fit the hypothesis and his results are in keeping with one of the predictions from that hypothesis, but the measure of these predicted results was a coarse one and the possibility of their having eventuated from other conditions than the ones intentionally established by the experimenter cannot be neglected.

Faulty Reproduction: Dissociation

1. *Janet.* It was apparent to Janet that many types of forgetting were not the result of mere passage of time. Such cases as that of Irene (**39**) indicated the conservation of experiences in verbal terms as well as in the form of general behavior. To distinguish between the two classes of forgetting, he postulated a process of dissociation which was responsible for amnesias of the pathological kind. It was assumed that the ideas which led to somnambulistic acts were retained intact during the periods intervening between attacks but that they were dissociated from the great body of ideas which made up the consciousness of the patient during his normal intervals. Dissociation was the opposite of association, indicating a discontinuity in the flow of ideas rather than a continuity.

To account for the frequent periods of dissociation Janet postulated the neuropathic personality which could be identified by certain constitutional stigmata. One of these, suggestibility, was responsible for the actual dissociation. Janet's theory of dissociation is so inextricably linked with his false beliefs concerning the hysterical personality, hysterical stigmata, and suggestibility that little can be gained from its examination.

2. *Morton Prince.* Like Freud, Prince adopted an emotional and instinctive basis for his theory of mental pathology. The concepts of emotion and instinct are essentially those of McDougall (**44**) and the

elaboration of sentiments follows closely that of Shand (70). Prince conceived the instinct as being a biologically developed reaction tendency with which was innately associated an appropriate emotion. The instinct of aggression, for example, could be called out originally by various environmental situations and through experience could become the natural response to many others. Associated with it would be the emotion of anger.

Each instinct-emotion possesses an impulsive force, or energy, which serves to make the organism an active and dynamic being; without the instincts, ideas (with which they become associated) would be incapable of initiating action. The "*impulsive force*" of the emotion-instinct "*is discharged in three directions:* the *first* is toward the excitation of those articulated movements and ideas which guide and carry the instinct to fruition. . . . *Second* (accessory to the first) the excitation of many of the various visceral functions . . . reinforces the instinctive movements. . . . The *third* direction . . . is toward the repression of the conflicting conative force of such other emotions as would act in an antagonistic direction" (60, p. 452).

The instinct, once stimulated, possesses inherently a tendency to be carried to fruition. Its associated affect is an integral part of the total reaction and may not be blocked without there resulting a blockage of the instinct as a whole. The affect serves as an emergency aid to the instinct in maintaining the proper conscious and bodily orientation toward the object of the aroused instinct. Since the induction of a different affect, *e.g.* fear at the time of arousal of aggression and anger, would interfere with the proper fruition of the initially aroused instinct, the affect serves also to prevent the occurrence of antagonistic emotions. Presumably the threshold for arousal of fear would be higher during a period of anger than during a calm period. "The utility of discharge [with reference to its repressing characteristic] is supplementary to that of the excitation of the visceral functions: *the former protects against the invasion of counteracting forces, the latter strengthens the force of the impulse in question*" (60, p. 454).

Since occasionally two affects may be stimulated simultaneously, conflicts will inevitably occur and one affect will be submerged by the other. The *principle of inhibition by conflict* may be stated: ". . . any affective state may be suppressed by conflict with another and stronger affective state" (60, p. 455). The ideas and actions associated with the suppressed affect will also be suppressed, but since the instinct has an inherent drive to come to fruition, once the dominant affect-instinct (*e.g.* sex) is satisfied the suppressed affect (*e.g.* disgust) can become active. Thus when the conflict lies between two conscious and temporarily aroused affect-instincts the inhibition of the weaker affect will not be permanent (60, p. 457).

"A persisting repression may be brought about either directly by volitional conflict or indirectly through the cultivation of antagonistic sentiments" (60,

p. 460). The sentiment is conceived as "being an idea about which a system of emotional dispositions has been organized" (60, p. 469). Like all ideas it may be conserved in the form of a neurogram and is therefore constantly operative, whether available to recall or not, as a part of the personality. Hence the arousal through appropriate stimulation of any instinct or sentiment in opposition to it will *at any time* immediately engender conflict. Sexual frigidity is given by Prince as the most outstanding example; the sexual instinct whenever aroused is immediately suppressed by coming into conflict with a permanently maintained sentiment of disgust, religious rejection, etc.

Subconscious activity occurs as a result of the dissociation of a sentiment from the main personality (61). "If an instinct is repressed (it being only an innate disposition) it ceases to be an active factor in the functioning organism. It is inhibited" (60, p. 468). But "a sentiment, . . . when repressed by conflict, or when simply out of mind, . . . is still a part of the personality." Even though it is repressed it is not entirely inhibited but may be "able to take on dissociated subconscious activity." It remains organized with its emotional dispositions and the conative forces of these may "continue striving to give expression to the idea" (60, p. 469). Thus "*any conserved idea (wish, etc.) activated by any of the innate emotional dispositions . . . may thus become the motive that determines mental and bodily behavior, whether conscious or subconscious*" (61).

Dissociation can occur, then, only with sentiments. The true instinct becomes completely inhibited by a conflict with a conscious or subconscious affect, but the sentiment, being composed of emotions which are conatively active, persists in its organized form. If it is in conflict with a general disposition of the personality on one hand or with a temporary disposition such as that induced by therapeutic instructions or the adjustmental needs of the moment on the other, it will be split off intact and become active in governing behavior. It will, however, be subconscious either in the sense of being unrecognized by the main conscious personality or by becoming co-conscious and existing as a secondary conscious personality (Prince, 62).

Any motor or affective tendency which conflicts with this dissociated sentiment will suffer the usual fate of a conflicting tendency if it is weaker than the dissociated sentiment, *i.e.* it will be inhibited. If, on the contrary, the conscious affect is stronger, the dissociated (subconscious) sentiment will continue to try to fulfill its aim of expressing its affect and ideas. Since these are antagonistic to the dominant affects and ideas various kinds of behavior will occur in order to circumvent the expression of the conscious affects and ideas. This process may be considered descriptively as a sort of trial and error procedure on the part of the dissociated sentiment to find a method of blocking the dispositions which have previously blocked it.

In other words, although the conscious process wins in the conflict with the subconscious process, the latter continues by devious tricks to circumvent the former.

One of the techniques by which this circumvention may occur is the development of an amnesia or the loss of consciousness. If the action of recalling and verbalizing an experience is in conflict with the sentiment, the disposition toward speech is inhibited, the memory remaining in the form of a neurogram, and the subject describes his behavior as being amnesic.

All amnesias do not limit themselves to the verbal material in conflict with the sentiment, and many cases of multiple or dissociated personality show wide-spread amnesias for periods of time rather than for material systematically related to the subconscious sentiment. These amnesias result from a chance association between the various forgotten materials and the sentiment or from the occurrence of the experiences during a period when the dissociated sentiment was conscious. When it becomes dissociated again it carries with it all the associated memories (cf. Freud's *after-expulsion*).

3. *Discussion.* As do other explanations of amnesia, dissociation theory rests largely on inference from clinically observed phenomena. Even fewer relevant experiments can be cited than for repression. Prince's case reports (**57, 59, 62**), voluminous in comparison with the psychoanalysts', demonstrate beyond peradventure that extensive verbalizations of experience may become unavailable to voluntary recall but still be retained. That the dissociation process is responsible for such phenomena is a conclusion resting on the doubtful evidence of certain experiments with hypnosis, automatic writing, and crystal-gazing or abstraction; the relevance of these experiments depends on Prince's assumption of the identity of these states with pathological dissociation.

Prince conceived of hypnosis (**63**) as being a condition of dissociation inaugurated by auto- or hetero-suggestion. Its development involved *depersonalization* (inhibition of certain dominant reaction patterns) and *repersonalization* (integration and activation of previously subconscious sentiments, etc.). This conception of hypnosis was derived from his frequent observations of spontaneously aroused amnesias, anesthesias, personality regressions, and other symptoms. That such symptoms may occur spontaneously cannot be questioned, but that they are in any sense inherently characteristic of hypnosis *per se* has been challenged by Hull (**36**) on the basis of extensive data from his own laboratories. In the discussion of rapport (**36,**

p. 270) he suggests that they arise from unintentional auto-suggestions in the form of preconceived beliefs concerning the nature of hypnosis. This criticism largely invalidates Prince's explanation of dissociative amnesia in so far as it rests on his hypnotic experiments.

Prince's (**58**) and Burnett's (**9**) hypnotic experiments demonstrated the possibility of intelligent activity and verbal recall without the presence of conscious recognition or realization that these activities were occurring or had occurred. Both used automatic writing as the vehicle for the non-conscious activity, and talking or quoting poetry as the conscious task. In a carefully controlled experiment Messerschmidt (**49**) has shown that even though 2 such activities as oral serial addition and written serial addition may be performed simultaneously with one task non-conscious, there is nevertheless as much or more interference between the 2 tasks as when both are conscious. Hull (**36**) points out, in a consideration of this work, that there are really 2 questions concerning the validity of the dissociation theory: first, whether a very complex activity can be carried out without representation in consciousness, and second, whether there is a true functional independence (in terms of efficiency) between the two tasks when one is non-conscious. The answer to the first is clearly in the affirmative, while the evidence from Messerschmidt's experiment indicates a negative answer to the second. Corroboration may be drawn from Mitchell's experiment (**51**) in which it was discovered that learning material interpolated between learning and recall of series of nonsense syllables produced as great retroactive inhibition when the interpolated material was rendered amnesic (dissociated) before the final recall as when it was not.[17]

Prince, however, did not claim that the dissociated process was never influential in modifying behavior of the conscious personality; on the contrary, he believed the various symptoms of neurosis to be specifically the result of interference from the dissociated sentiment or personality. His only contention was *that this conflict and interference occurred outside of consciousness* and the patient did not recognize his symptoms as deriving from conflict. An amnesia, for example, would seem similar to any other instance of forgetting but would, in actuality, be an inhibition of the recall process by subconscious antagonistic sentiments whose emotional reactions were in conflict with the emotional reactions associated with the recall.

Prince's position with reference to this latter point is essentially that adopted in the restatement of the repression hypothesis given above. The anticipatory drive response (r_D) is associated with recall or verbalization and the anticipatory response to punishment or fear

[17] Hull's (**36**) detailed analysis of hypnosis as dissociation obviates the need of lengthy discussion here.

(r_y) is in conflict with it. Both these responses are presumed to be the physiological correlates of emotions.[18]

The chief criticisms which may be levelled at the dissociation theory are that, first, it depends on the purposive concept of instincts; Prince, like Freud, viewed behavior as a striving toward various ends or goals. And second, it is not sufficiently definitive as to details to permit immediate experimental investigation. Like the repression hypothesis it needs restatement.

Prince to a greater extent than Freud has retained the idiom of association psychology and has emphasized the extreme importance of conflict between excitatory tendencies. The facts explained by the repression and dissociation theories are much the same. A repressed impulse and a dissociated subconscious sentiment with its associated actions and ideas are in all essential respects identical. Both concepts emphasize the effects on recall or verbalization of fairly permanent reinforcing stimuli (motives) but confuse the issue with an energic concept of motivation.

McDougall (**45**, p. 236) distinguishes the two processes, however, on two grounds: (a) repression is evidenced by a continuing conflict with distress to the patient (" return of the repressed ") while dissociation seems to remove the conflict; and (b) ". . . whereas [repression] is commonly a slow gradual process, attaining many different degrees that vary from moment to moment according to the reciprocal play of the repressed and repressing forces, dissociation is apt to be a sudden process, instantaneously accomplished." Neither of these differences appears to be truly qualitative; both may be considered as descriptive extremes of either repression or dissociation. McDougall suggests (**45**, p. 238) but does not altogether accept the possibility that dissociation can occur only after a repressive tendency has been developed; he cites Janet's case of Irene as an example. The completeness of dissociation in dissociated personalities and the incompleteness in cases of repression (*e.g.* Jones, **40**) are probably the result of differences in the relative strengths of the inhibitory and excitatory tendencies.

In general, Peters' restatement (**55**) of the repression process seems adequately descriptive of many cases of sudden and instantaneous dissociative amnesias arising either from emotional traumata or

[18] Lundholm (**43**) has presented a theory that the amnesia is "an inhibition by a subconscious mechanism, which attacks . . . the specific striving which was at work relative to the experience on its occurrence."

from toxic conditions: that any material cannot be recalled which is incompatible with the determining tendencies present at the moment of attempted recall. In general, if the theory of dissociation were to be completely restated in the stimulus-response idiom adopted by Peters for his theory of feeling, there seems good reason for considering it a valuable hypothesis coördinate with the repression hypothesis as an explanation for amnesias of reproduction.

Conclusions

Amnesia of impression may occur for events taking place during a period of alcoholic intoxication or extreme fatigue and logically should be found as a result of strong emotional preoccupation. The few reported cases of anterograde amnesias dating from emotional shocks, however, have shown recovery either spontaneously or by special treatment and must be considered amnesias of reproduction. Retrograde amnesias likewise belong to this latter classification when they are occasioned by emotional shocks. The similarity from an operational standpoint between retrograde amnesia and retroactive inhibition suggests the hypothesis that both are degrees of a single continuous function. Retrograde amnesias resulting from head injuries or other traumata producing unconsciousness or disorientation appear to be true amnesias of retention, but whether the shock simply prevents a necessary consolidation of the memories (Woodworth) or actually damages the fibers of the nervous system in some way is at present unknown.

Amnesias of reproduction have a number of fairly well defined characteristics upon which most students agree. Among these are: (a) the reproductive response tendency is retained; (b) volition and simple instruction are insufficient to elicit the response; (c) emotional responses are always associated with the amnesic response; and (d) the amnesia is inexplicable in terms of the external conditions of its occurrence. Two principal theories, repression and dissociation, have been presented as descriptions of the psychological processes responsible. Both are inadequate in their present forms but each represents a useful hypothesis which may be tested experimentally providing it is restated in stimulus-response or other non-purposive terms. Little evidence from normal psychology can be brought to bear on them at present.

In general the experimental psychology of memory has been most productive in studying the effect of various conditions of learning

on recall; little or nothing has been done with the study of recall itself independent of the learning process. It is essentially in this latter field that amnesia of reproduction lies. Until experimental psychology attacks the problems of motivation, emotion, and conflict *in relation to memory* it will have little of significance to offer in the field of memorial abnormality.

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EYE MOVEMENT, PERCEPTION, AND LEGIBILITY IN READING

BY MILES A. TINKER
University of Minnesota

This review is a continuation of the series previously published in this journal (**69, 70, 71, 73**). A few early papers which were missed in the previous reviews are included in the list of references (**31, 32, 33, 34, 51, 55, 57, 79, 86**). No publications appearing later than October, 1935, are included.

Bibliographies, popular discussions, summaries of part of the field, and textbook surveys will be found in references **12, 28, 35, 36, 37, 45, 46, 49, 50a, 66.** New methods and new devices, or modifications of previous apparatus constructed for use in reading investigations are described in references **2, 6, 7, 16, 17, 18, 60, 68, 72, 78, 83.**

Eye Movements

Recent investigations of eye movements in reading have involved for the most part the measurement of oculomotor behavior in special reading and learning situations, determination of validity and reliability of the measures, and evaluation of the importance of eye movements in diagnostic and remedial reading. A few experiments have been concerned with establishing norms, the use of eye movements as measures of legibility, and the relation of eye movements to other measures of performance.

Studies of eye movements in the reading of oriental and foreign languages continue to appear.

Futch (**27**) reports on a comparison of the various measures of eye movements in reading Latin and English by beginning and experienced students. Both groups of subjects exhibited less efficiency in reading Latin than in reading English. Although the beginning and the advanced Latin students were affected similarly in going from English to Latin, the performance of the beginners was most affected. The closest approximation to reading English was in the pause duration on the Latin. Number of fixations was in second place while regressions showed greatest differences. The records indicated that marked improvement in reading Latin was possible, especially in regularity of fixations along the line of print and in perception time; nevertheless

the advanced students were still on a word-recognition level. Practically every word was fixated. Some of the very poor students tended to scan the Latin with relatively few fixations and with no attempt to read the material. Increased skill brought a gradual increase in fixations until a certain analytical mastery was achieved. Then with further improvement there followed a decline in pause frequency until there was an approach to the standards of reading in one's own language. The changed word order in Latin hindered beginning but not experienced students. Comparison of teaching methods revealed that emphasis on grammar and translation without abundant reading of easy material hindered the development of efficient oculomotor behavior. These results suggest important practical applications in teaching Latin.

A new study in the reading of Chinese is reported by Wang (82). Vernacular was read with fewer fixations and regressions, and at a faster rate than literary Chinese (from which the vernacular was translated). Pause duration showed little change from one to the other. Normal reading required more fixations than rapid reading, and careful reading more fixations than normal. Progress of eye fixations along the lines of print was similar to that in reading English. Compactness of the Chinese printing (square shape of words), however, led to smaller spacial distance between fixations than for the English. More words were read per fixation in the Chinese. Since only a few subjects were photographed and because it is practically impossible to equate the amount of practice in English and Chinese for any individual, some aspects of the quantitative comparisons of eye movements in the two languages must necessarily have doubtful validity. In another study of Chinese, Hu (43) found that silent reading was always more efficient than oral reading. More and longer fixations were employed in reading poetry than for a novel or for classical prose.

Oculomotor patterns vary considerably from one situation to another. Ewert (24) discovered that in comparing eye movements during non-activity, reading, and recall after learning, the characteristic eye movements which reading necessitates perseverate in frequency during recall of material previously read and learned. He suggests that these eye movements accompanying the verbal recall are themselves a part of the recall. These interesting results should be checked by photographing the eye movements and plotting the location of the fixations on the original reading copy.

In other special types of studies Antibon (8) made analyses which indicate that eye-movement patterns during writing are somewhat analogous to those in reading, and Ovio (52) points out that there is a certain amount of disharmony of the eyes in reading. In a more complete study, Clark (16a) has compared eye movements of individuals having normal binocular balance with those of an exophoric (muscular imbalance) group. No differences between groups were found in either fixation frequency, regression frequency, pause duration, or time required for complete divergence movements at the beginning

of the lines of print. The lack of a difference here may be partly explained by the fact that Clark matched his groups on the basis of reading scores, and eye movements are measures of reading ability. The author did find that the exophoric group made greater divergent movements at the beginning of the lines. It was suggested that these divergent movements are a factor in ocular fatigue. On page 534, the author evidently meant that the size of the divergent movements was 9.1 minutes larger for the *experimental* group, rather than for the control group as stated.

In a comprehensive study, Gilbert (30) compared the oculomotor and perceptual habits of good and poor spellers from Grade III through the senior high school as they learned to spell words. At every grade level the good spellers employed fewer fixations, a shorter study time, briefer and less variable pauses, a broader study unit, and fewer regressions than the poor spellers. In studying spelling the subject's eyes progressed from left to right with some regressions. Successive cross-passages over the whole word were made in this manner until the word was learned. The mature student is more systematic than the inefficient student in his eye-movement sequences. Since there is a strong possibility of sampling errors in the groups of only 3 or 4 subjects used, the growth curves of eye-movements presented by Gilbert cannot be accepted as valid. True growth curves can be obtained only when the same group of individuals are measured on successive years.

A quantitative and qualitative analysis of eye movements in reading prose and objective examination questions differing in type and by measured amounts of difficulty is reported by Frandsen (25). In general, perception time, fixation frequency, and regression frequency increased in the order: true-false, completion, multiple choice, analogy. In line with the findings in many other investigations, there was very little variation in pause duration.

Although there was a fair relationship between the eye-movement measures for the various types of questions, there was little correspondence in performance from prose to the questions, or from one level of difficulty to another in the questions. Characteristic differences in oculomotor patterns occurred with the various types of questions. These patterns consisted of analytical sequences of movements and a typical procedure which was adapted to the type of question being read. Analysis of these patterns indicated that the oculomotor processes were subordinated and flexible in their responses to the central processes of apprehension and assimilation.

The eye movements of good readers have been studied by Walker (80, 81). The mean pause duration was .255 sec.; there were 2.92 ems per fixation (25 ems per line), and .70 regressions per line.

Increase in difficulty of the reading material brought an increase in pause duration and a decrease in the size of the fixation field, but the extent of the *forward* shift of the eye movements was little affected. Walker also discovered that a relatively large amount (10%) of the reading time was taken by the moves. This amount is larger than any previous investigator has found and needs checking, preferably in a study employing reading material varying in type and difficulty. Lack of vertical movements and marked binocular coördination in the records suggests that monocular horizontal movements are sufficient for studying the performance of good readers.

In comparing the eye-movement records of successful and unsuccessful college students matched for intelligence, sex, and major subjects, Eurich (22) discovered no marked or statistically significant differences. The successful students revealed slightly shorter pause duration, a slightly greater pause frequency and a slightly smaller regression frequency. Successful students read slightly faster and comprehend slightly better than unsuccessful ones of the same intelligence. Litterer (47) found for college students only a moderate relationship between visual apprehension and eye-movement records ($r = .47$ to $.63$). Fourth and fifth grade norms for eye-movement measures have been established by Eurich (23). The variabilities presented with the medians enable one to compare individual cases with these standards.

Black print on a white background is read faster than white print on a black background. Taylor's investigation (67) showed that this difference in favor of black printing is due to a smaller fixation frequency. Pause duration in the 2 forms of printing was the same.

Workers in the field of eye movements have only recently become interested in knowing the reliability and validity of their measures. Litterer (47), Futch (26), Eurich (20, 21) and Frandsen (25) have all found high reliabilities for eye-movement measures. Most of these coefficients fall between .75 and .90. When determined by this method (split-half or odd-even) eye-movement scores have high internal consistency. Test-retest reliability coefficients will be published shortly by the reviewer.

Pause duration, fixation frequency and regression frequency have all been used without discrimination as measures of reading speed or reading proficiency. The implication has been that the measures mean the same or nearly the same thing. Since perception time (sum of pauses) is a good practical criterion of speed in reading, the other photographic measures may be compared with it. Using relatively large groups of subjects who read several kinds of material, Tinker and Frandsen (76) found a high correlation between fixation frequency and perception time, a fair correlation between regression

frequency and perception time, and a highly variable correlation between pause duration and perception time. It was concluded that fixation frequency was a good measure of speed of reading, regression frequency a fair one, and pause duration a poor one. These findings are in substantial agreement with preliminary findings cited by Tinker (71, ref. 94) and with later results reported by Eurich (21) and Futch (26).

Robinson and Murphy (61), in checking the accuracy of eye-movement records obtained by direct observation against photographic records, found that a large number of the movements were missed by the experimenter doing the counting. Group trends are revealed fairly well, however, by the direct counting method.

Attempts have been made to validate eye-movement measures by correlating them with achievement on standardized reading tests. Litterer (48), employing speed of reading and comprehension tests as criteria, obtained raw correlation coefficients for adults between test scores and eye-movement measures ranging from —.27 to —.51. Comparable results cited by Eurich ranged from —.02 to —.24 for adults (20), and from —.11 to —.55 for children (21); by Futch (26), +.06 to —.63 for children. It is clear from these results that validity with achievement test scores as criteria is low. In these experiments the material read before the camera has either been entirely different from that in the reading tests or has been read with a different reading attitude. Data in the field of reading indicate that there are many reading skills which are somewhat independent. When the reading attitude changes from one test to another, or when the material in one test is not strictly comparable to that in the other, the highest correlation found between test scores is approximately .60, but the coefficient may be anywhere between .00 and .60. Since coefficients between .25 and .45 are quite representative of the correlation, the validity coefficients cited above *may* indicate adequate validity for the eye-movement measures. At the best, however, this is an unsatisfactory method of determining validity. Probably the most adequate way of computing validity of eye-movement measures of reading ability is to employ as criteria the scores on material which is strictly comparable to that read before the camera. In a study not yet published the reviewer found validity coefficients computed in this way to be uniformly very high (—.87 to —.99) except for pause duration (—.10 to —.31).

Eye-movement records have been employed to study individual cases with reading and speech difficulties.

According to Jasper and Murray (**44**) the eye movements of stutterers during oral reading show marked irregularities. These readers revealed marked tremor in adjusting the eye to fixations in reading, and relatively marked vertical eye movements. There was some evidence (1) that the dominant eye came to the correct accommodation and adjustment in the fixation pause earlier than the non-dominant eye, and (2) that there were "blocks" in the eye movements similar in nature to those that exist in the movements of speech-muscles for these subjects.

In a comprehensive study of 21 retarded readers in comparison with a control group, Robinson (**58, 59**) has attempted to evaluate the rôle of eye-movement habits in determining reading ability. Training for comprehension had no effect on the eye movements. However, the training for rate which included eye-movement "pacing" produced more words read per fixation and fewer regressions. Robinson states that the "pacing" improved eye-movement habits, which in turn increased reading efficiency. This conclusion may be questioned. There is much evidence that eye movements, for the most part, are merely symptoms rather than causes of reading proficiency.

Gates and Bennett (**29**) and Gates (**28**) have emphasized the apparent rôle of eye movements in reading disability. They recommend that the eye be trained to follow a finger moved along the line of print, or a moving spot of light projected along the line by a motion picture machine. These highly formal techniques for training eye movements are in most instances of questionable value and may frequently become a liability. A careful consideration of the part played by eye movements in reading suggests that Gates and Bennett have made questionable inferences concerning the rôle of eye movements in enhancing tendencies to reversals in perceiving words.

Two critical papers on eye movements are reported by Tinker: (1) an evaluation of the rôle of eye movements in diagnostic and remedial reading (**74**) in which he concludes that measurement and "pacing" of eye movements may be dispensed with in the reading clinic without lessening the effectiveness of diagnosis or remedial instruction; and (2) an evaluation of the use and limitations of eye-movement measures of reading (**75**).

Visual Apprehension and Perception

Study of visual apprehension and perception constitutes only a minor portion of the recent experimental work in reading. A few reports have appeared on span of apprehension which, as shown in previous papers in this series of reviews, appears to be related to perception in reading. A series of investigations in this field is reported by Anderson and Crosland. A preliminary study (**2**) revealed no

advantage in reporting seen letters in a left-to-right order over a right-to-left, or over a center-alternate order. In considering the effects of eye dominance on apprehension of letter series, they (3) found that left-eyed subjects excel right-eyed subjects at the right side of an exposure-card of 9 letters, and that right-eyed subjects were superior to left-eyed subjects for the leftmost letters of the series. This superiority was relatively greater for the left-eyed subjects. Place of eye-fixation on the series had no effect on the results. In a second study (4), there was a rather prominent tendency for left-handed subjects to apprehend letters near the middle of the letter-series more accurately than right-handed subjects. When the effects of eyedness and handedness were combined (5), definite advantage in apprehension of letters within specific parts of the letter series occurred. Considering all 4 studies, the left-eyed and left-handed subjects were superior to those who were right-eyed and right-handed. It is possible that further analysis and discussion will reveal a significant bearing of these findings upon the reading process.

Chapman and Brown (13) report that the enhancement of clearness of certain letters in a series by variations in size, color or position is accompanied by a reliable decrease in the span of apprehension. This is an agreement with the "law of reciprocity." Another determinant of visual apprehension is reported by Dahmen (19) who found that recresal tended to reduce errors in the reports of his subjects.

Confirmation of previous findings on tendencies toward grouping in visual apprehension of letters, toward transposition of letters, inability to report all symbols seen clearly, and the like, is found in Aveling's report (9). Litterer (48) has attempted to determine the relationship between visual apprehension, reading and intelligence. There was a moderate correlation between apprehension scores for meaningful material and reading, but practically none between nonsense series of letters and reading. All apprehension scores, however, were significantly associated with intelligence.

Chou (15), continuing analyses reported earlier, emphasizes what he calls the Gestalt qualities involved in the perception of Chinese characters. In contrast to this, Hollingworth (42) states that it was demonstrated long ago that words do not function as "Gestalten." The fact that the shape of a word, or seeing certain letters of a word leads to perception of the word is considered to be only the ordinary law of perception. Partial stimuli function redintegratively; incomplete Gestalten do not exhibit "closure." The term "Gestalt" as applied to words is considered to be only a smoke screen. Most will agree that "Gestalt" in the above sense should not be applied to words. Word-form is a more descriptive and more adequate term

to employ when characterizing the effect of shape of words on their perception.

Further evidence that the beginning of the word plays a dominant rôle in word perception is given by Grund (40). Data collected from the tachistoscopic reading of school children demonstrated that initial letters of German nouns are apprehended much more readily when they form part of a word than when they are alone or in a nonsense series of letters. The effect upon perception of these letters at the beginning of a word is not one of simple dominance; the initial letters are merely important determinants in the perception of the word as a complex unit.

Employing a modified tachistoscope, Preston (56) discovered that familiarity was an important factor in speed of word perception. Familiar words are perceived and named at a much faster rate than unfamiliar words of the same length. Speed for familiar words, however, was highly diagnostic of speed for unfamiliar words. That is, the speed factor is common in both situations. Speed of single word perception was found to correlate fairly well with speed of reading and vocabulary knowledge but only to a slight degree with reading comprehension.

Legibility of Print

The Chinese continue to manifest an interest in the legibility of their own language. Using large groups of Chinese school children as subjects, Ai (1) compared the relative efficiency of quick perception of materials printed in vertical and horizontal arrangements. In general, at Grade VI, at the junior high school level, and in the senior high school, vertical printing was read faster and more accurately than material in the horizontal arrangement. Although these results are consistently in favor of the vertical alignment, one should know how much experience the readers have had with each arrangement before coming to definite conclusions regarding the relative legibility of the 2 ways of printing. Chou (14) presents further analyses of data already reported to show that the total Gestalt-qualities of a Chinese character determine to a large degree its legibility.

Paterson and Tinker have continued their series of studies on typographical factors influencing speed of reading. A comparison (53) of material in 10 point, 19 pica line length, Scotch Roman, set with 1, 2, and 4 point leading or space between lines, with material in 10 point type, and a 19 pica line length, set solid, revealed that: (1) 1 point leading does not facilitate speed of reading as compared with text set solid; (2) 2 point leading increased speed of reading by

7.5%, while 4 point leading increased speed of reading by only 5.0% in comparison with the material set solid. The advantage of 2 point leading over both smaller and larger amounts of space between lines may hold only for the particular size of type and length of line used in this investigation. Further studies should undertake to determine, therefore, the effects of leading with larger and smaller type sizes and for various lengths of line. Such studies are under way.

In study number IX of their series, Tinker and Paterson (77) determined the effect that reduction in size of newspaper print had upon speed of reading. The problem was raised by the need of preserving newspaper accounts of historical events for historical scholars and libraries. Such reductions may be made by photographic, by the planographic offset-printing process, or by some similar technique. When newsprint is reduced to 80% of normal only a slight and insignificant reduction in speed of reading occurs. If the reduction is 50% of normal, reading is slowed by about 10%. When the print is reduced to 30% of normal size, however, speed of reading is slowed up by almost 75%. From a practical viewpoint, such as the need for preserving historical documents, one may conclude that newsprint may be reduced to about half-size without undue loss of legibility.

In the final study, Paterson and Tinker (54) investigated the relative legibility of 10 different styles of type face. No important differences in rate of reading text material were found for the 6 following type faces: Scotch Roman, Garamond, Antique, Bodoni, Old Style, Caslon O. S., Kabel lite, and Cheltenham. Two type faces retarded speed of reading: American Typewriter type by 5.1%, and Cloister Black type (Old English) by 16.5%. They concluded that type faces in common use are equally legible.

The relative legibility of 10 type faces (the same as those used by Paterson and Tinker) was obtained by Webster and Tinker (84). The legibility was determined by measuring the distance from the eyes at which single words could be read correctly. Legibility measured in this manner differed markedly from legibility measured in terms of speed of reading. While word-form is apparently an important determinant of speed of reading, size, heaviness, and width of printing stroke are more important when perceiving words at a distance. Some factors which increase perceptibility of words at a distance reduce speed of reading. By the distance method, the order from most to least legible was: American Typewriter, Cheltenham,

Antique, Old Style, Caslon O. S., Garamond, Bodoni, Scotch Roman, Kabel lite, Cloister Black. Many of the obtained differences in perceptibility were highly stable. In another report (**64**), a way to recognize type faces is described by Stanley.

Greene has conducted 2 experiments on the legibility of typewritten material. In the first study (**38**) which involved lithoprinting reproduction of typewriting, the results indicated: (1) there was no difference in speed and accuracy of reading 7, 10, 12, and 14 point type; (2) the material with leading, especially the longer lines, was read somewhat faster (3.5%) than text set solid; and (3) text in the very long line was read slightly slower than in the short line.

In a second study (**39**) Greene discovered no reliable differences in speed of reading text in Ionic linotype and in typewritten samples. This is not in line with the results cited above from Paterson and Tinker's investigation. Examination of the printed samples in each study reveals that: (1) in Paterson and Tinker's experiment the typewritten material occupied about 33% more lines than the Scotch Roman (ordinary print); (2) in Greene's study, however, the typed material covered approximately the same number of lines as the Ionic. This difference in the size of the typewriter type undoubtedly explains why Paterson and Tinker found that such material was read slower than ordinary type, and Greene found no difference between it and ordinary type (Ionic). In an earlier report (**71**, ref. **89**), the reviewer has demonstrated that compactness of printing is an important determinant of reading speed.

Working with first-grade children Buckingham (**10**) found that 12 point type was read consistently faster than 14, 18 or 24 point type. These latter 3 sizes were all read at approximately the same rate. This advantage was found to hold for 12 point type with 4 point leading but not with 3 point leading. Leading did not seem to help the readability of the larger type sizes except there was a slight advantage for 6 point leading with 24 point type. Since the advantage for the 12 point type with 4 point leading is only 9 to 13 seconds on the average, and the ratio of the difference to the standard error of the difference is only 2.0, the stability of the difference is not high nor is the difference large. Actually one might have concluded that any one of the printing arrangements was as good as any other. Furthermore, if smaller sizes of types had been used they might have been as efficient as the larger sizes. A hint from other lines of evidence tends to show that variation in typography within rather large limits may have little or no effect upon the reading of children in the lower grades. Further research is needed to settle the question.

An investigation by Webster and Tinker (**85**) of the influence of egg-shell, artisan enamel, and flint enamel paper surfaces upon the perceptibility of words failed to disclose any differential effect during short working periods. Legibility was measured in terms of distance from the eye at which words printed on these papers could be read accurately. The alleged eye-strain from reading material printed on glazed paper must be due to continuous reading in light not uniformly dispersed rather than to inability to see the print satisfactorily in good illumination.

Facts involved in legibility of posters and signs have received some notice. Sumner (**65**), examining 42 combinations of De Voe's showcard colors, substantiated earlier findings that legibility depends upon the brightness difference between print and its background rather than upon the colors as such. Dark letters upon a light background were more legible than light letters upon a dark background. Severny (**63**) found that the rectangle and the triangle were the most readily perceived signs employed as road signals. Next came the circle and the square. Rocard (**62**) found that the visibility of objects lighted by a projector depends mainly upon contrast effect and size.

According to Burkersrode and Burkhardt (**11**) capitalization of German words reduces legibility.

In an extensive investigation on the legibility of black and white print, Taylor (**67**) found that in every comparison made, black print on a white background was more legible than white on black.

This was true whether legibility was measured in terms of span of visual apprehension, speed of reading, recognizability in peripheral vision, or the greatest distance at which the print could be read. In very small type these differences in legibility are increased. A serifless style of type was equally legible except in small sizes where the black print is more legible. For nonsense material the white print is relatively more inferior than in sense material. Analyses indicate that the inferiority of the white print is due to effects of irradiation. When black print is used the detrimental effects of irradiation are counteracted by the addition of serifs which tend to preserve the characteristic forms of the letters by emphasizing their corners. With white letters, irradiation will increase the apparent size of the letters, but it will also tend to blur their outlines, close their open spaces, and fuse their parts. This will decrease their legibility. These results will be most marked when the letters are small, and when there are no auxiliary cues to perception as in nonsense material. They should be least effective in the larger sizes of serifless type. The application of these findings to printing practice is obvious.

The examination of large samples of handwriting for legibility by Newland (**50**) revealed that the illegibilities of only 4 letters (a, e, r, t) contributed 45%, 46% and 47% to the totals for the elementary, high school, and adult groups respectively. Forms of illegibility tended to be characteristic of each age group rather than common to all. For the most part illegibilities were due to (1) the failure to

close letters, (2) closing looped strokes, (3) looping non-looped strokes, and (4) using straight up-strokes rather than rounded strokes. It seems possible, therefore, that preventive and corrective work in handwriting can be both definite and concentrated to the few places where the illegibilities occur.

Summary

The experimental study of eye movements, perception, and legibility in reading during the past 3 years is characterized by a marked expansion in eye-movement studies. Much new apparatus has been devised for measuring eye movements, workers have become interested in establishing the reliability and validity of these measures, and most of the investigation has been confined to special reading situations or to diagnosing and remedying disabilities. Few advances have been made in studying perception in reading. Most of the legibility experiments have been concerned with discovering the relative legibility of typographical arrangements encountered in the consecutive reading of children and adults.

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BOOK REVIEWS

WEISENBURG, T., AND MCBRIDE, K. E. *Aphasia: A Clinical and Psychological Study.* New York: The Commonwealth Fund, 1935. Pp. xvi + 634.

This book commands attention as perhaps the first instance of a major attack on a psychopathological problem by the combined resources of medicine and psychology. It is not proposed to discuss here the strictly medical aspect of the contribution beyond noting that the status of those involved is *prima facie* assurance of a good level. Psychologically the work is quite the most thorough that has been attempted in the field, and gives evidence of much care and skill. The material (p. 121) consists essentially of 60 cases of aphasia proper, 38 cases of right-sided lesions without aphasia, 25 cases from other clinical groups, and 85 normal cases so selected as to offer the best available controls. The scope of the psychological inquiry was such that not less than 9 hours work was required in any case, and the average per case was 19 hours, much longer periods being spent with cases where reëducational procedures were involved. The treatise opens with a review of the aphasia concept, principally concerned with the recession of structural in favor of functional interests, and devoting much effort to establishing a deserved recognition of the work of Hughlings Jackson. After short accounts of the clinical material and methods of study, the body of the work takes up the aphasias in fourfold classification as expressive, receptive, expressive-receptive, and amnesic. Descriptions of findings are supported at this point by illustrative cases only, fuller case material being supplied as Appendix I. Then follows presentation of the control group of right-sided lesions with no aphasia, and of material on apraxia and agnosia. The clinical course of the aphasic cases is further detailed, with a somewhat generalized survey of reëducative method. Psychometric findings for many specific cases are given in profile form, in units of probable error from norms of population, and as an estimate of the patient's norm. Fuller account of the psychometric procedures is given as Appendix II. Each chapter is accompanied by a clear summary.

The loss to the study of aphasia is especially heavy in Dr. Weisenburg's untimely death. The psychological steps to be built upon this foundation would probably involve working with procedures more specialized to aphasic disorders. Some of Head's tests are very favorably criticized, but in general the trend of this work is away from specialized procedure, perhaps further than was wholly wise. The selection of the present group of tests from procedures well standardized in psychometric practice, clinical or educational, has obvious advantages with reference to norms; yet the well-matched controls make interior standards quite as relevant, and it is hard to escape the feeling that the use of so much procedure designed for anything but these problems must involve considerable lost motion. Where each case is so individual a problem, detail of presentation becomes very important. In this respect it would be hard to do better than the authors have done with the mass they have to deal with, but the question obtrudes itself if a smaller and more specialized mass could not have been still better digested. For example, the important question of free answer *versus* multiple choice is barely alluded to; the simple yet highly interesting relation of forward to backward memory span is little if ever mentioned, though the observations must have been made.

The broadest criticism applies perhaps to the general concept of aphasia which is involved in this work. Aphasia is at best a loosely used term presenting, as such, analogies to "dementia praecox." It is used here to denote pretty much any disorder in which disturbance of language function is the outstanding characteristic. But aphasia is not properly the name of a nosologic entity; it is the name of a special and partial symptom-complex which may have all sorts of pathological associations. Repeatedly the authors say in effect that, since there is never a pure language disorder clinically, aphasia should not be looked on as essentially a language disorder; a formulation inimical to clear thinking. It would be much better to look on aphasia as denoting that group of symptoms which involve the language function, occurring in various disease conditions whose other symptomatology varies with the underlying disorder. Similar criticism applies to the negative attitude toward aphasia as a disorder of symbol-forming capacity. Except as the disorder *is* one of symbol-forming capacity, it is simply not aphasia; there would be more reason in actually restricting the term aphasia to that type of symbol formation

which is defined as language. This can of course include a wide range; music, and the "language of flowers," conceivably. From this standpoint the practical problem of aphasia examination resolves itself into stimuli and responses, *either free answer or multiple choice,* of the following types:

Through (what) medium of sense presentation can the patient (how readily) make (what) type of language response?

Presentation: hear word; hear description of thing denoted; hear representation of thing denoted; see word; see description of thing denoted; see representation of thing denoted (picture); feel word (*e.g.* Braille or raised type); feel object; smell object; taste object.

Response (free answer): repeat orally; write; speak definition; write definition; show function; describe function (*e.g.* emotional expressions).

Response (multiple choice among): spoken words; written words; oral definitions; written definitions; shown functions; described functions (*e.g.* emotional expressions).

Realizing that these combinations for so simple a thing as *key* are no small number, and that their difficulty for the patient is a function of familiarity with the thing, *key* vs. *diplodocus,* for example, it is obvious that no test series can do more than slightly sample the patient's capacity. The efficient goal would appear to be a systematic review of these relationships at graduated levels, until breakdown is evident. In any case with clinical symptoms of "aphasia," such breakdown would appear at a level well below what is normal in a person of the patient's cultural history, and below the level of his accomplishments where language is not an essential factor.

The authors have a further contribution to make with reference to the much slighter but allied disorders of language function in normal individuals. Simple observations suffice to demonstrate them, especially those of the "amnesic" sort. The report of the normal sample (p. 123, footnote) will be a document of the highest psychometric interest.

A fundamental source of the difficulties noted is perhaps worth comment. Neuropsychiatrist and psychologist each knew and did their own jobs very well. But neither knew quite enough about the other's job. There were in the set up none who envisaged the aphasia problem in its broadest relations, who could thus bring its manifold aspects into the most effective mutual relevance. Possibly there exist no persons who would have done so. But this lack is one to make

itself felt elsewhere in projects of organized research, and is among the essential limitations in organizing it.[1] The sponsors for large scale research undertakings should keep this fact in mind.

F. L. WELLS.

Boston Psychopathic Hospital.

WALLIN, J. E. W. *Personality Maladjustments and Mental Hygiene.* New York: McGraw-Hill Book Company, 1935. Pp. xii + 511.

This book contains a wide range of information and illustrative material concerning the mental aberrations of essentially normal people. There is no tendency to emphasize the abnormal or pathological, and for the most part the author successfully avoids the technical terminology of psychiatry. The book may be profitably studied and readily understood by teachers, students, parents, social workers, and others without the necessity of previous psychological or psychiatric training. Indeed, its usefulness is more evident for such persons than for specialists in mental hygiene, psychology or psychiatry.

As indicated in the title, there is an extensive description of various personality maladjustments along with a consideration of their causes, prevention, and correction. These topics are discussed largely in conjunction with some 195 autobiographical reports of mental, educational, and social maladjustments contributed by the author's students in various educational institutions. The author admits (on occasion) that these reports are subject to the rather serious limitations common to this type of material. However, by careful selection, classification, and editing they have been made considerably more pertinent to the topics discussed than is usually the case with such material. Since these reports are used almost entirely for illustrative purposes, rather than accepted as scientific data upon which to base conclusions, there is little reason in the present instance to emphasize their inadequacy.

The author's viewpoint toward mental hygiene is indicated in the following passage: "The outstanding emphasis in mental health conservation work has no doubt gradually been shifted to the positive objective of the preservation of normal mental health rather than the negative aim of the rehabilitation of shattered mental integrity." In keeping with this viewpoint there is a considerably greater emphasis throughout the book on child training, educational objectives and methods, and ways of solving personal difficulties, than on mental

[1] Cf. also Wheeler, Wm. Morton, The Organization of Research. *Science*, 1921, **53**, 53–67.

therapeutics. This is as it should be in a book intended for a wide public.

Several chapters are devoted to a "detailed consideration of the various types of faulty reaction patterns to which many people resort for solving their problems. These are to a large extent false remedies or deceptive defense mechanisms which if persisted in tend to develop unwholesome social attitudes and unsuccessful methods for meeting the multitudinous issues of life, and which often lead to mental disintegration." This is the key-note to a considerable part of the book. In this, as in similar books on the subject, the reader must continually repeat to himself the phrase "*which if persisted in*" if he is to avoid believing that some very ordinary ways of meeting commonplace problems are much more inimical to mental health than they actually are. Such "reaction patterns" discussed are: trial and error adjustments, dodging responsibilities by evasion, minimizing difficulties, refusal to acknowledge defeat or failure, self-justification through shifting the blame, self-justification through comparison with inferiors, procrastination, rationalization, regressive and day-dreaming adjustments, and compensation.

Taken as a whole the book may be accepted as a fair picture of the present status of mental hygiene. Its good points and weak points are present in the field of mental hygiene in general. The following criticism therefore refers to this book as representative of publications in the field of mental hygiene.

In *Personality Maladjustments and Mental Hygiene,* the writer presents a thoroughly convincing case for the need of mental hygiene in modern life; one is not convinced that mental hygiene is at present in any position to cope with this need. In short, considerably more research is required before an adequate mental hygiene can be written. The author indicates this when he writes: "It is inevitable that the improved research techniques that the psychology and psychiatry of the next few decades will perfect will contribute a truer and deeper understanding of the mechanisms discussed in the text."

There is the usual difficulty of telling people many things they should do without definitely indicating how they are to do them. This difficulty is general in the field of mental hygiene. However, it is true that a knowledge of what should be done, such as the author presents, is in itself essential, even though its practical usefulness is somewhat limited. The problem of getting the individual to think, feel and act as he may very well know he should think, feel and act is the greatest

practical difficulty in the way of a broad and effective mental hygiene program. The only solution to this difficulty is research, and autobiographical material such as presented by the author, although relatively unreliable, is valuable.

For a book which is so closely related to the field of psychology, there is surprisingly little quantitative data. This is also characteristic of mental hygiene in general. Mental hygienists and psychiatrists have been slow to grasp the significance of many of the quantitative methods which have been developed in the field of psychology with regard to the measurement of attitudes, neurotic tendency, personality, and the like. This is unfortunate because science in general indicates that quantitative evaluation is one of the most powerful aids to the control of any phenomenon.

The systematic viewpoint presented in the book is so eclectic as to be almost absent. It ranges from a basic emphasis upon the conditioned response to a broad consideration of psychoanalytic theory. With regard to the latter, however, the author emphasizes what is good in the therapeutic methods of psychoanalysis and provides his own interpretation as to why such methods work. Mental hygiene in general is characterized by the same tendency to consider therapeutic methods as more important than theoretical elaboration, and very rightly so.

Taken in all, the book is as good a presentation of the broad field of mental hygiene as is available. It is not a book on psychology, psychiatry, education or child study, but draws upon them all. As a result a highly systematic presentation of such diversified material is difficult in a field which deals with such intricate subject matter, and is of such recent development as mental hygiene.

There is a well selected bibliography of about 300 recent publications in the field as well as an appendix containing suggestions for overcoming stage fright and other forms of fear.

S. N. F. CHANT.

University of Toronto.

DORSEY, JOHN MORRIS. *The Foundations of Human Nature.* New York: Longmans, Green and Company, 1935. Pp. xiii + 488.

Readers are warned in the preface that this is a "potent mixture" for the maintenance of personal health. And they are further warned by the editor in his foreword that this book "will not make light reading." So the reviewer braced himself for a jolt; but was

disappointed to find that after all this warning there was in the contents nothing either very heavy or very potent. A hasty reading might indeed leave the impression of profundity because the style is often labored. But the style is also notably uneven. Sometimes the author appears to be addressing a luncheon club audience; again he is apparently speaking to college professors or teachers of mental hygiene; and there are far too numerous places where he appears to be organizing his own thinking as he writes. Much space is devoted to assertions about what a hygiene text should be. There is much use of exclamation and oratorical interrogation. The aim appears to be the highly commendable one of giving the reader an insight into the problems of human behavior, and to give to these problems the larger racial or evolutional setting. The attitude is that of the scholarly thinker and the medical practitioner who is interested in human welfare. A few chapter headings may suggest the general nature of the contents: the structure of personality disorders, mental hygiene insights, the biological background, ethno-psychology, the constitutional pattern of man, orientation within the personality, what to educate for.

Much use is made of literary and philosophical material, and there are many quotations. The author even seems to prefer such to the literature of those sciences upon which mental hygiene is commonly assumed to be based. A glance through the many references will reveal that far more use is made of such sources as Bunyan, Wordsworth, Wilde, Russell, Emerson, and Will Durant than is made of the literature of psychology and psychopathology. In fact there is a notable lack of use of the contributions from these sciences. The only child, parental effects upon growth, sibling effects, and play are treated without consideration of the many studies which have appeared in recent years on these subjects. Many statements appear which would be important if they were well supported by authenticating references, but these are unfortunately lacking. It is said for instance that the "dream stands as an atavistic relic of archaic humanity." The experimental literature of dreaming is omitted. That "like prefers like" is asserted without reference to the studies on the consciousness of kind which only partially support such a statement. It is also said that it is usually possible to tell much about a person if one knows what kind of nursing he has had. This would be important if true but the author does not refer the reader to supporting researches. The term complex is used without explanation. Jung's

notion of the unconscious is accepted and the author says that the unconscious is a "storehouse of archaic memories." An effort is made to include a consideration of religion and its hygienic aspects but apparently the author is not very well read in the psychology of religion. Many topics are quite as notably absent. One is a bit surprised to find in a "potent mixture" for mental hygiene no trace of the psychology and physiology of fatigue and of relaxation. Sex receives very little consideration. The word sex does not appear in the index at all. And one wonders why all the experimental work on atmospheric conditions and mental efficiency was omitted. Far too often the reader is asked to accept statements on the writer's authority alone and far too often there appears the we-mental-hygienists-know attitude or the we-psychiatrists-know attitude. These are poor substitutes for reference to scientific sources. In spite of the many defects of the book, the reviewer turns from it with the impression that the author must certainly be a wise physician and one who exerts a most wholesome personal influence. If the book could be thoroughly revised and the literature of psychology and psychopathology be fully utilized it might be made into a widely useful volume.

EDMUND S. CONKLIN.

Indiana University.

DEWEY, EVELYN. *Behavior Development in Infants. A Survey of the Literature on Prenatal and Postnatal Activity, 1920–1934.* New York: Columbia University Press, 1935. Pp. viii + 321.

According to the author, the purpose of the book is to present a review of selected salient results on growth processes and infant behavior published during the period 1920–1934. By behavior is meant the neuromuscular and glandular reactions of living organisms. "Social and emotional behavior have been omitted since their very existence involves interpretations which lead us afield into theoretical speculations." The first chapter is devoted to a very brief discussion of the theories of development based on the experimental studies of the psychologist, biologist, physiologist, and neurologist, and to evidences of the relation between structure and function.

Following this chapter, the literature on fetal, neonatal, and infant behavior including the second year of postnatal life is in turn "assembled from the point of view of obtaining an understanding of growth processes, that is, by behavior patterns rather than by the usual method of what an individual or a group can do at successive age

levels." For each age segment the findings of experimental studies are discussed under appropriate headings such as crying, pupillary reflexes, lifting the head, and manipulation and other hand activities. The available references, of course, determined the space devoted to each section. The final summary indicates that the literature does not yield an "adequate picture of the total course of development of single patterns" or does not yet "conclusively support any one of the current theories of behavior." In view of this conclusion Miss Dewey's task has been a difficult one and it is not surprising that her grouping does not present a more illuminating and coherent picture of the development of behavior patterns than is obtained by the methods of other authors. She rightly points out the weakness in studying behavior development by scale items which emphasize specific performance at a given age and disregard the "detailed course of each pattern and its relation to the total pattern."

By judicious comment and by pointing out the gaps and inadequacies in existing knowledge the author has put forth a well considered critical survey. The language is relatively non-technical and expresses with creditable accuracy the findings of the studies reported. The title of the book, however, is misleading since one would expect a broader and more exhaustive survey including atypical development and the influence of nutrition and other environmental factors.

The personal equation in the selection of salient studies cannot, of course, be eliminated. In Miss Dewey's book the emphasis through the neonatal period of development is naturally on neurological interpretations of behavior. Although the word biology is used frequently there is no reference to such experimental studies as those of Spemann. The responses of the organism to modification of its structure are surely as fundamental and significant for the understanding of behavior as are the responses of the Amblystoma to stimulation. Even in the field which is emphasized, there are conspicuous omissions. For instance, Magnus' name is mentioned, yet there is no reference to his publications.

In the field of language behavior where experimentation is very difficult and where all studies are very inadequate, Strayer's observations cited in her experimental study, *Language and Growth,* might well have been mentioned. In a bibliography covering 15 years of research, limited to 216 citations, omissions are, of course, inevitable. However, one is pleased to see certain excellent less known studies given the recognition which they deserve.

That the data presented, particularly for infancy, are in many instances already out-dated is a comment on the rapidity with which knowledge of early human development is accumulating.

The research worker will study the book with profit since the neurological implications of behavior are covered more completely than in other surveys. The book is obviously not intended as a reference book and as an elementary text it is too limited in scope for the usual courses offered, while as an advanced text it competes at a disadvantage with the *Revised Handbook of Child Psychology*. Miss Dewey's book will, I believe, find its greatest value as an historical review of research trends in the investigation of early behavior development.

HELEN THOMPSON.

Yale University.

WIEMAN, HENRY NELSON, and WESTCOTT-WIEMAN, REGINA, *Normative Psychology of Religion.* New York: Thomas Y. Crowell Company, 1935. Pp. x+564.

This rather formidable volume makes its appeal to a selected group. It has little to offer the religious man-in-the-street and not a great deal to offer the student of the psychology or the philosophy of religion. It has neither historical nor ethnological approach and little interest in the existing religious situation. It is not easily classifiable since it is neither philosophy nor theology nor psychology, but a somewhat illegitimate mixture of these with less flavoring of psychology than one would expect from its title. If a geologist should write a book for professional geologists with the express intention of bolstering their conviction that it is a very fine thing to be a geologist, but without much discussion of the actual data of geology, he might produce a very similar book.

Religion is notoriously a difficult thing to write about. It can be defended and it can be attacked but he is a rare man who can discuss it. The authors do not discuss so much as defend religion, and they do so by setting forth a statement of the nature of religion which would sound strange in the ears of the naïvely religious man, if he should ever read it.

In Part I, entitled "Orientation in Religious Living," the authors approach their task with the intention "to study the essential functions of religion in human living and set forth the norms implicit in these functions." They elaborate this statement by affirming that "scientific accuracy can never take the place of critical evaluation

and evaluation is impossible without norms, either explicitly stated or implied in the appraisals." This statement is only half true, for it is equally true that critical evaluation cannot take the place of scientific accuracy. The half truth offers a temptation to work out, in one's armchair, a set of nicely consistent norms instead of discovering the underlying principles of religion by observation of its actual practice. It seems to the reviewer that the authors have yielded to this temptation.

Religion is here defined as that behavior which attempts to connect life with whatever a person holds to be extremely worthful. Worth or value is mutual support or enhancement between enjoyable activities, which the authors seem to think of as exclusively nonsensual. The greatest conceivable value which can probably never be realized, is the organization of the cosmos into a system where every activity is sustained by every other. Supreme value which is possible is the greatest actual connection between activities, a connection which makes them mutually sustaining, enhancing, and meaningful. To be religious is (1) to recognize that creative interaction is going on, (2) to search it out, and (3) to yield to it.

These concepts are unexceptionable and no attempt need be made to criticize them, but it must be pointed out that, if they are intended as a definition of the social phenomenon of religion, they leave something to be desired. They are obviously the product of study rather than of factual observation.

The second and third parts of the book are respectively devoted to discussions of "Psychological Functions in Religious Living" and to "Religious Growth." They contain carefully argued and involved statements concerning such phenomena as faith, prayer, sin, mystical experience, and progressive integration of personality. These chapters are well designed for further establishing the viewpoint of the authors. Here and there appear assertions of a surprising nature. For instance, on page 142 there is a roundabout argument in support of the view that prayer may be effective in obtaining such specific things as health, money, and new automobiles. Prayer does this, it seems, by altering the attitude of the one praying—but only if other conditions permit. It is difficult to designate this argument as other than an attempt to hunt with the radical hounds and run with the conservative hares.

The fourth and last part of the volume is a discussion of "Problems in Religious Living." This section, like the others, is so general as to be of slight use in actual case analysis. It is true that case

studies may not be material with which the religious person, as such, works. The reviewer is inclined to think they are not. But if they are to be discussed at all it should be with candor and realism. These chapters contain no mention of crime, of sex problems, of micro-depressions, or of any of the other actual problems which the religious advisor must meet if he meets any at all save theoretical ones.

The volume may be useful to persons who are strongly desirous of retaining their adolescent fixations on religious terms and are searching for interpretations of these which they can accept and fit into an intellectualistic system. The book is apologetic in method and content rather than a study of religion as it exists today or as it existed yesterday. Within limits the book merits approval, perhaps high approval. It is not an unintelligent book. It is thoughtful and systematic. But the question must be raised as to whether it is normative in any scientific sense and whether it is a psychological study at all.

GEORGE R. WELLS.

Hartford Seminary Foundation.

NOTES AND NEWS

THE ELEVENTH INTERNATIONAL CONGRESS OF PSYCHOLOGY will meet at Madrid September 6 to 12, 1936. All correspondence concerning the meeting should be addressed to J. Germain, General Secretary, Instituto Nacional de Psicotecnia, Alberto Aguilera, 25, Madrid.

The meetings of the Congress will include: (1) *Symposia.* Papers (4,000–4,800 words) should reach the secretary before May 1. (2) *Round Table Conferences* of eight or ten members each. Papers should be not longer than 800 words, and should reach the secretary by April 1. (3) *Conferences,* of 45 minutes each, for the discussion of definite problems of psychology, which will be led by outstanding psychologists in various fields. Summaries of problems for discussion should reach the secretary by May 1. (4) *Contributed Papers.* Abstracts of not more than 100 words should reach the secretary by June 1. The sections for presentation and discussion of papers will be arranged according to the number and titles of the abstracts received.

An exhibit of psychological apparatus, tests, and other materials will be held in connection with the Congress. Members should indicate on the back of the registration blank their intention to enter the exhibit; this notice must reach the secretary at least thirty days before the opening of Congress.

The Compagnie Internationale de Wagons Lits-Cook has official charge of hotel reservations in Madrid. Itineraries for further travel in Spain can be arranged through this company or through the Bureau National de Tourisme, Madrid.

THE MIDWESTERN PSYCHOLOGICAL ASSOCIATION will hold its annual meeting at Northwestern University, Evanston, Illinois, on April 24 and 25, 1936, under the presidency of Dr. Christian A. Ruckmick of the University of Iowa. The title of Dr. Ruckmick's presidential address will be *Psychology Tomorrow.*

THE AMERICAN ASSOCIATION ON MENTAL DEFICIENCY will hold its sixtieth annual meeting at the Hotel Jefferson, St. Louis, Missouri, on May 1, 2, 3 and 4. The Friday sessions will be devoted to general

and sociological aspects of mental deficiency; the Saturday sessions to psychological and educational topics with special stress on educational disabilities. The Monday sessions will be given over to research activities, medical aspects, and administrative problems in mental deficiency. Some of the speakers are: Popenoe on *Sterilization;* Goddard on *Social Security;* Hincks on *A National Program;* Kirkbride on *Public Welfare;* Hackbusch on *Social Service;* Vanuxem on *Education;* Berry on *Teaching Techniques;* and Humphreys on *Research Problems.* Everyone interested in the mentally defective or retarded child is invited to attend these sessions. The complete program may be obtained from the secretary, Dr. Groves B. Smith, Godfrey, Illinois.